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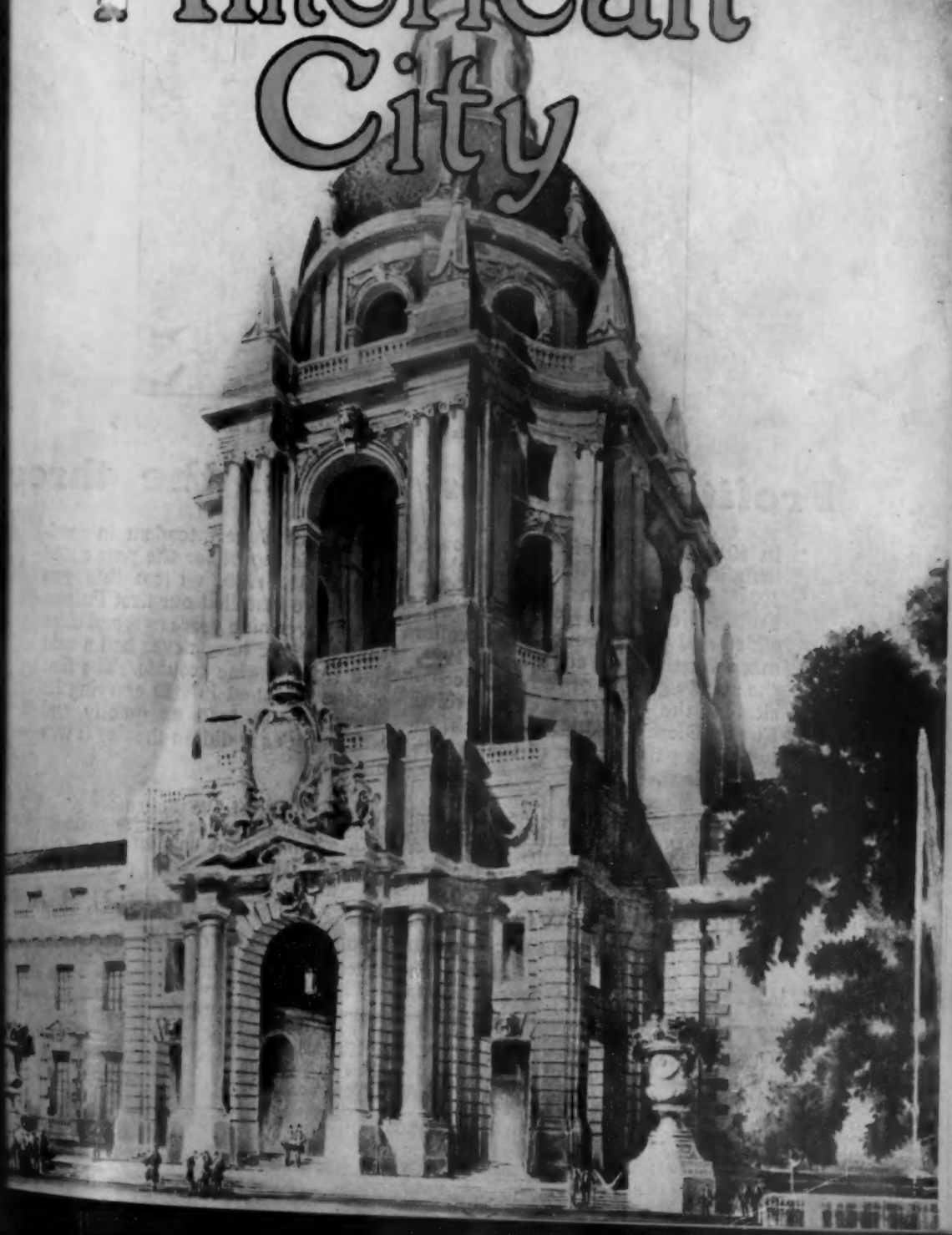
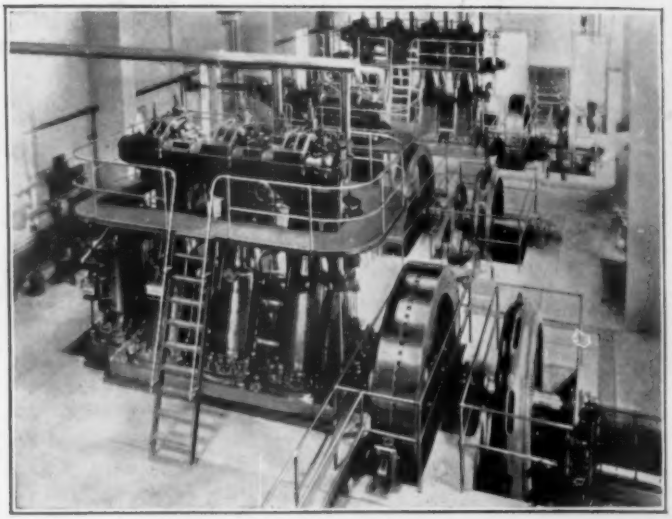
November, 1926
Vol. XXXV No. 5
50 Cents $4 a Year

The American City



FULTON DIESEL



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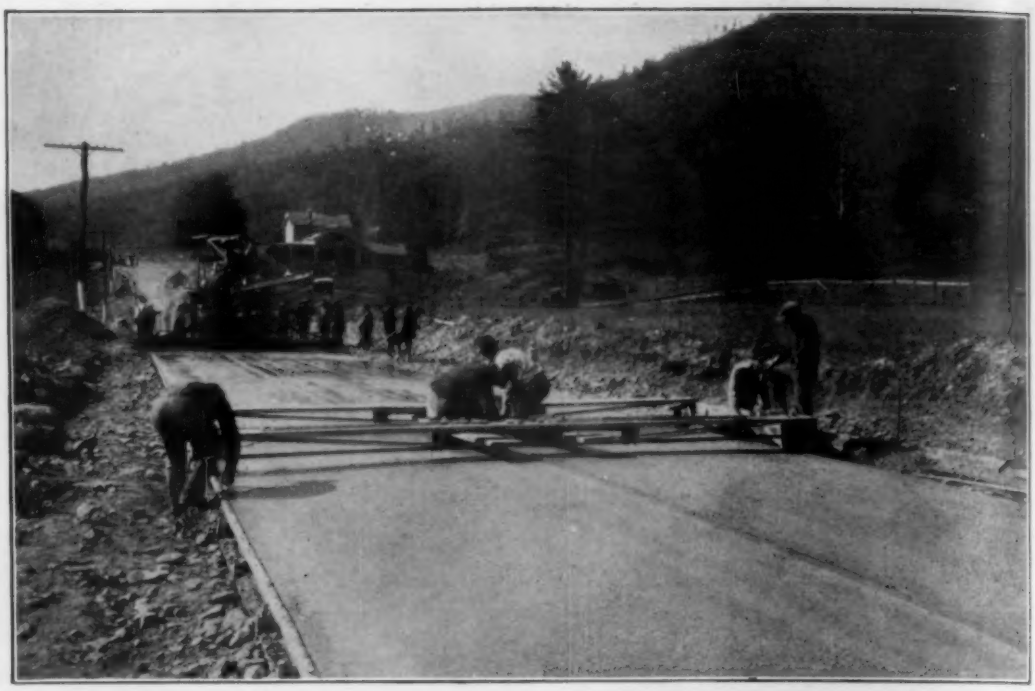
The offices of THE AMERICAN CITY, 443 Fourth Avenue, N. Y., are headquarters for the free distribution of information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.



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Vol. XXXV
No. 5

The American City Magazine

NOVEMBER
1926

443 Fourth Avenue
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50 Cents
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A Forecast of the Regional Community of the Future

By Thomas Adams

General Director of Plans and Surveys, Regional Plan of New York and Its Environs

I CAN visualize two forms of great city regions that will exist on this continent when the youth of today have entered on the final laps of their race with life. Great centers like New York and Philadelphia will still be striving to maintain their supremacy, but a new kind of urban region will have sprung up to influence them and compete with them.

Just as the manufacturer has discovered the value of discarding old machinery in favor of new, the city will learn that old, dilapidated buildings are a liability and that the making of great physical improvements is a sound investment. In the future, old cities will be reshaping and rebuilding their blighted areas as a matter of self-preservation.

Developers of real estate will not be permitted to speculate in land, as a necessity of life. Those who subdivide land for building will be required to make it fit for building by constructing roadways, sewers, and other local improvements, in advance of the sale of land. Playground space will have to be provided as an essential feature in any new subdivision, as street areas now are. Building codes will require more durable forms of construction, and the cost of fire prevention will be greatly decreased. Great transportation and park corridors will radiate out from and surround the cities, giving rapid means of communication through open areas devoted to park and spacious residence areas. At strategic points along these corridors satellite cities will have grown up, connected by railroad and highway with the metropolitan center and amply provided with space for expansion of industry and healthy living conditions.

Several classes of highway will exist. There will be rapid speedways from 120 to 150 feet in width paralleling railroads and serving lighter industry, business, and apartment house areas. Interchange of freight and passengers between railroad and highway will be a common practice. The use of streets for loading and unloading of merchandise will be gradually disappearing. Owners of property will be required to carry on their business on their own premises, and streets will be more and more

Great New Centers Will Arise

In his paper before the joint meeting of the American City Planning Institute and the City Planning Division of the American Society of Civil Engineers, held in Philadelphia, October 8, excerpts from which comprise the accompanying article, Mr. Adams gave a stimulating challenge to the newer and smaller cities:

"The older cities will not be the only centers of the urban regions of the future. Great new centers will arise and be developed with the aid of knowledge of the past and in keeping with new opportunities. These new communities will be so developed as to cause the older communities to mend their ways.

"The great regional communities of the future will be so large and the places suitable for efficient concentration within them will be so numerous that there will be no necessity for congestion. Large sections of land suitable for cultivation will lie between the transportation and power corridors and local points and maintain an efficient and economical balance of development. The older city regions will gain much of their impetus to improvement from competition with these new communities. They will derive their power from great generating stations erected adjoining waterways and railroad freight terminals. They will be within easy reach of the city, but not on dear land in the centers."

confined to public purposes. Busses and other highway vehicles will have properly equipped terminals, as the best railroads have today. Parkways from 150 to 500 feet in width, with driveways through them for rapid automobile traffic, will penetrate through areas largely used for residential purposes. In central areas elevated railroads will have largely disappeared. Air right over many railroads will be used for elevated highways. The tendency in the centers will be to place railroads with their electric equipment underground and to have raised sidewalks for pedestrians, fronting on or arcaded into buildings. This will not add to congestion but merely remove some of the effects of congestion created at the beginning of the 20th century.

Zoning will have become more constructive and more stable. It will be based on adequate and sound standards of health and safety. Physical planning and zoning will be linked together so that, as the requirements of the law in regard to height, and area of occupancy, are strengthened, less necessity will arise for restricting the character of use. Factories and apartment houses will have more spacious surroundings and will fit in agreeably with adjacent residences. The owner of the factory will have learned the lesson of the Fifth Avenue merchant that ugly ancillary features and disorderly surroundings are an injury to his business.

Interspersed between the closely developed areas along railroads and highways there will be open areas within which land will be permanently reserved for such purposes as country estates, golf courses and truck gardens. Regional cooperation will have ended the pollution of drinking waters and developed comprehensive systems of sewage disposal. The social needs of the community will be largely met without great loss of time in traveling, because it will be realized that there is enough land in the country to provide all facilities necessary for healthy living conditions within easy reach of every inhabitant.

The hot-dog stand and the gasoline station will be things of the past. Just as the old English inn was a picturesque feature along the highway, so there will grow up a new kind of hostel with pleasant surroundings where all the needs of the highway traveler can be provided.

Special ways will be set apart for pedestrians, so that walking will have become a restored art. Speedways will have bridges and subways provided for pedestrians, and separation of grades for important intersecting roads.

Motor cars will pay a proper share of the cost of highways and thereby keep up the balance between increase of vehicles and provision of highway facilities for motor travel. Rapid transit will pay for itself. More facilities for recreation, the results of education, and more stringent application of justice will have reduced crime.

High buildings will still be erected, but under proper regulations as to area of occupancy, so that they will have become less crowded and more in the nature of isolated monumental features of the city.

There will be a reaction against the crowding of high office buildings together and also against the apartment dwelling as a residence. A compromise will have been reached between the apartment building and the cottage which will give to a new type of home the advantages of each of the others.

Provision will have been made for numerous landing fields for aeroplanes, used for long-distance transportation and mail service. Commuting, not having increased on the whole, will be more than amply served by transit lines and improved highways. Trolleys will still operate on special rights of way, but bus services will have taken the place of many trolley lines now in use and will have become the most popular form of transit for short distances.

The more even and more open form of development, and the prevention of land speculation by irresponsible developers, will produce more stable land values. In the aggregate, land values will be no lower—but they will be more evenly distributed. Assessment of land and taxation will be more carefully adjusted to the best productive uses of land. For instance, taxes for urban improvements based on potential building values will not be levied on land permanently zoned for cultivation, or for recreation areas, such as golf courses, thereby making possible the reservation of open areas on private land.

Important Trends in City Development Which Are Hastening the New Era

Tendencies in connection with transportation by rail and highway within regional areas are all towards facilitating quicker movement and more efficient distribution. These tendencies will continue to promote concentration of large populations in urban regions. This concentration has of course a great economic value, and so long as it is not permitted to lead to congestion it need not be injurious to health, safety, or general welfare. The causes of congestion, as distinct from an efficient degree of concentration, lie in the lack of proper control of

land development; the support that is given by law to abuses of property rights; the lack of proper standards of density and height of buildings as a basis for zoning; and the lack of harmony betwen physical planning and zoning regulations. The greatest menace to the modern city is that it will persist in avoiding the removal of these causes and simultaneously develop its facilities for transportation, and promote new sources of energy. These facilities and forces will produce good or ill in proportion as the concentration they cause will be well or badly regulated by law and planning.

Perhaps the most hopeful fact in the metropolitan regions of America is the extent to which land is being acquired for parks. It may be many years before zoning of private property can be based on standards that will give cities ample space for freedom of movement and for light and air in buildings, and before it can be given a permanence that will make it really effective in preventing congestion; it may be still longer before areas of land in these regions can be zoned for agriculture and horticulture and made integral parts of the open areas of cities; but the movement towards acquiring large areas of land for permanent open space for parks and parkways has gained an impetus that is full of promise as a means of giving future areas of urban expansion a large degree of lung space permanently dedicated to public use and ever present as a stimulus to better-balanced development.

The architect, the engineer, and the social investigator will in the future take a broader view of city problems. Zoning has already given a lead to a new architectural conception of city building, and as a force in town development it is still in its infancy. Scientific developments in relation to electric power, production of metals, improvement of machinery, and transportation; needs of great urban regions in regard to comprehensive systems of drainage, water-supply and adequate open spaces; these and other things will bring the engineer and the landscape architect face to face with great concrete problems of regional development and make them more expert in the art of regulating city growth.

If nothing else forces action of governments and communities to plan comprehensively, compulsion will come from economic necessity. Great cities today are within sight of the end of the financial resources available to meet their needs, a condition that has been brought about by the wastes and inefficiencies incidental to economically unsound methods of development which permit unhealthy and unsafe conditions both of overcrowding in the central areas and of undercrowding in suburban and rural areas.

* * * * *

Thus we see that the growth of science, the pressure of economic forces and, let us hope, the growth of average intelligence, will bring into being new communities and reshape the old in accordance with sane, practical ideals of what a great regional community should be. All we can do is to help in pointing the way towards the realization of these ideals and develop our science and our art so that we shall be ready to make our contribution to the demands of the future.

Overcoming Obstacles of Organization and Finance

(From the Discussion, at the Philadelphia Convention, of Mr. Adams' Forecast of the Regional Community of the Future)

By William J. Wilgus

Consulting Engineer, New York

MR. ADAMS has glowingly pictured the urban region of tomorrow as it should be; but to translate his convincing dream into the much-hoped-for reality, two formidable obstacles must be overcome. They are: lack of centralized organization through which efforts may be coordinated and real results accomplished; and a lack of capital with which to finance projects of enormous magnitude.

The first of these is serious, because a multitude of varying interests, too often antagonistic or indifferent, have not found a common ground on which to approach our law-making bodies for needed legislation. The remedy would seem to lie in the voluntary coming-together of representatives of all interests in the regional community—political, corporate, and individual—by a method that would fairly recognize the weight that should be given to the voice of each of them. Such a body, working through a small executive committee of high-minded, able, and public-spirited citizens, and guided by the advice of experts of note, should be successful in formulating plans and legislation

acceptable to enlightened local sentiment and therefore compelling upon our legislatures and Congress. From a movement of this kind should come forth a compact organization having the will, the capacity, and the power to accomplish things for the general good.

Public Works Not Necessarily Dependent on Taxation

The second of the obstacles would fade away if we put behind us the idea that funds for public works necessarily must be provided through taxation. That is a bugbear that paralyzes the community and kills progress. The average citizen looks on taxes with aversion because he sees no tangible direct return for his expenditure. As a rule, he does not object to paying for that which brings an obvious immediate reward that caters to his pleasure, convenience, or necessity, or by reason of which he may make or save money.

A case in point is the Holland vehicular tunnel beneath the North River, which has been financed by the states of New York and New Jersey on the promise of toll collections from those who will use the tunnel in preference to ferries. In this respect the beneficiaries who foot the bill would have been even better served if real estate bordering the entrances and exits had been compelled to contribute toward the cost of a fair share of the increase in value which it is reaping because of the changed conditions. Another instance is that of the Grand Central Terminal development, to which the writer ventures to refer with some diffidence because of his responsibility for its inception. There, departure from precedent and the utilization of dormant "air rights" has brought a golden reward from by-products much more than sufficient to carry the enterprise without placing an additional burden on the traveler or the public at large.

In a word, lack of capital, as an obstacle to adequate planning and building for the future, will disappear if man will have the ingenuity to utilize to the last degree all revenue-producing by-products that can be made to flow from the new conditions, and also the courage to allocate the remaining net costs among the beneficiaries, namely the users and reapers of benefits.

As the writer sees it, effective *organization*, and *self-support* to the fullest possible extent, are the keynotes of success in the timely carrying-out of major plans for the future of regional communities.

Proposed $500,000,000 Plan to Erase New York's Slums

THE expenditure of $500,000,000 for the purpose of razing all the old-law tenement houses in New York City, replacing them with model apartment buildings with rents fixed on the basis of income and ability of the tenants to pay, is the drastic proposal of August Heckscher in a report just submitted to Mayor Walker of this city. Mr. Heckscher recently returned from Europe, where, at the Mayor's request, he made a study of housing conditions in large cities.

The aim of the philanthropist, as set forth in the plan, "is to get 500 wealthy and public-spirited citizens in New York to promise a contribution of $100,000 each annually for five years as a nucleus toward eliminating the slums once and for all." It is suggested that the state and city jointly contribute a like sum over the same period, thus giving a total yearly income of $100,000 for five years, "enough to get away to a real start on New York's most pressing and immediate problem." The project, it is estimated, could be completed in from ten to fifteen years. Mr .Heckscher's conviction that this is an entirely feasible scheme is based particularly on investigations of measures for the elimination of slums now being taken in London, Hamburg, and Berlin.

The proposed plan, which has aroused considerable interest and comment among housing authorities and city planners, will be submitted by the Mayor to the City Committee on Plan and Survey.

A Valuable Service for Health Officers

TO the health officer who wants those under his care to receive up-to-date news on health, but who is not in a position to publish a regular bulletin of his own, the American Public Health Association offers a new and particularly interesting service. This is a small eight-page bulletin sent out monthly in the form of plates ready for the printer. The health officer furnishes his own paper and has the printing done in his own city.

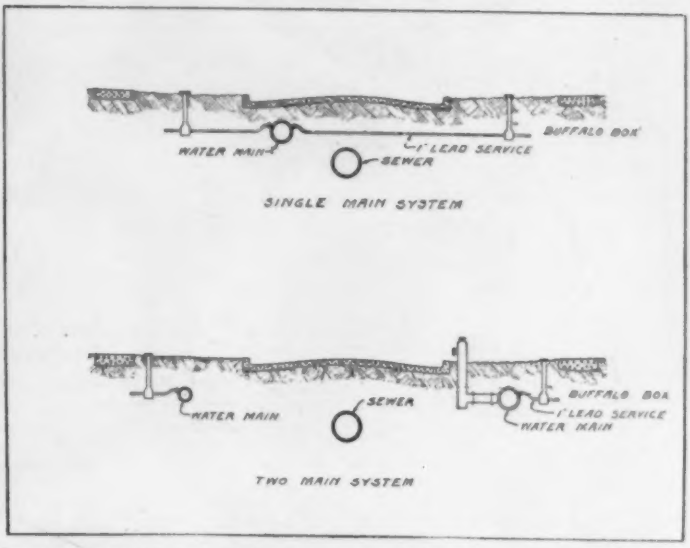
There is nothing in the bulletin to suggest that it is a syndicated publication. A two-inch space is allowed at the top of the first page for the insertion of any type of heading desired, and the last four pages can be rearranged so as to leave space for local news, monthly statistics, etc. Each issue will contain popular articles written by well-known health authorities; cartoons and live illustrations; a page devoted to diet and health; and important facts of preventive medicine—all of a type to hold the interest of the average man and woman that the health officer wishes most to reach.

This service makes it possible for even the small health department to issue a monthly news bulletin with the minimum of work and at the lowest possible cost. Information as to the terms of the service can be secured from the American Public Health Association, 370 Seventh Avenue, New York.

Use of Two Water-Mains in Wide Streets

By Thomas F. Wolfe

IN the days, not long ago, when horse-drawn vehicles furnished the means of transportation and haulage, the narrow streets we find in the older sections of our big cities were ample for the traffic they were called upon to carry. The number of vehicles was few as compared to what we now have and the speed was necessarily limited. The introduction of the automobile changed these conditions. Streets that formerly took care of a few slow-moving vehicles are now required to handle large numbers of fast-moving automobiles. The net result is that where streets as narrow as 30 feet were once fairly common, we now find streets from 80 to 200 feet in width,



INSTALLATION OF ONE- AND TWO-MAIN SYSTEMS ON WIDE STREETS

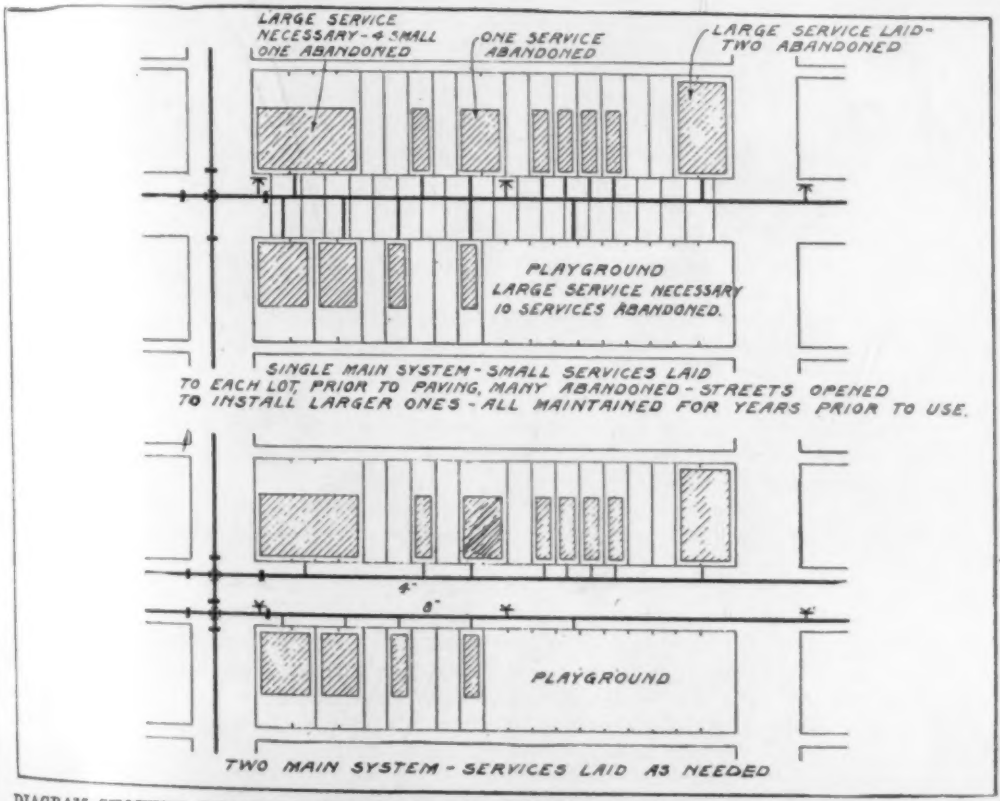
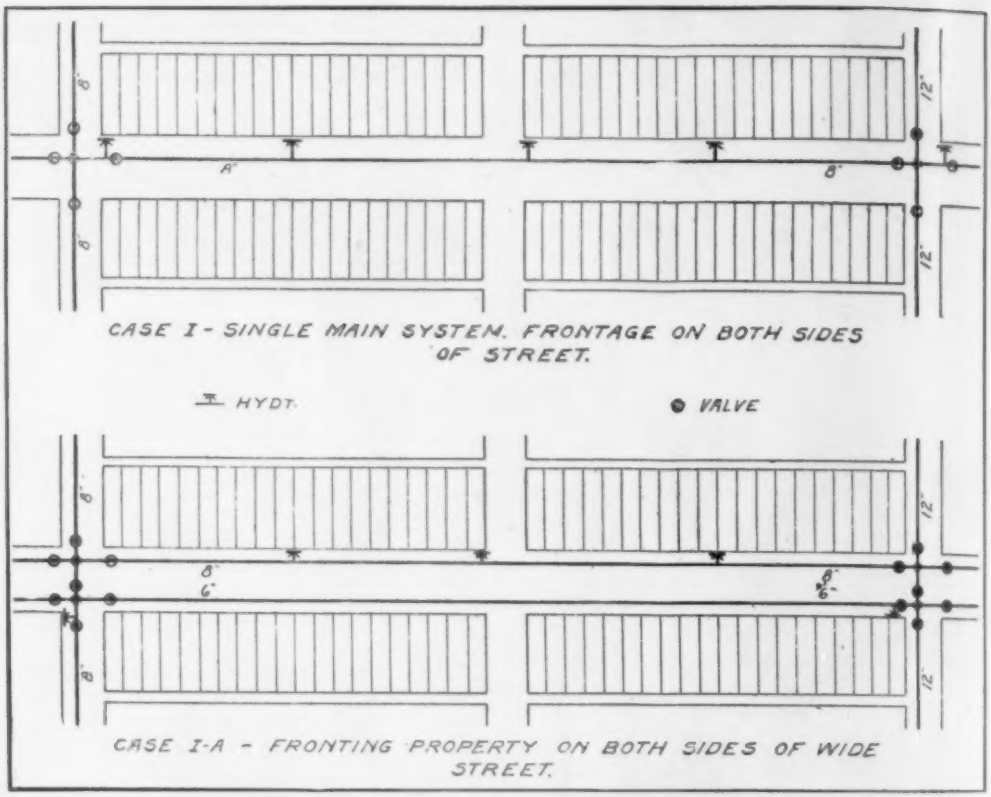

LARGE SERVICE NECESSARY - 4 SMALL ONE ABANDONED
ONE SERVICE ABANDONED
LARGE SERVICE LAID - TWO ABANDONED
PLAYGROUND
LARGE SERVICE NECESSARY
10 SERVICES ABANDONED.
SINGLE MAIN SYSTEM - SMALL SERVICES LAID TO EACH LOT PRIOR TO PAVING, MANY ABANDONED - STREETS OPENED TO INSTALL LARGER ONES - ALL MAINTAINED FOR YEARS PRIOR TO USE.
4"
8"
PLAYGROUND
TWO MAIN SYSTEM - SERVICES LAID AS NEEDED

DIAGRAM SHOWING RELATIVE ADVANTAGES OF TWO-MAIN SYSTEM WITH APPRECIABLE SAVINGS



DIAGRAMS SHOWING CASES I AND IA DISCUSSED IN TEXT

with roadways all the way from 40 to 80 feet. In addition to affecting the width of roadways, the automobile has influenced the design of the pavement. During the days of horse-drawn vehicles, wheel loads were necessarily limited by the capacity of the horse, whereas modern motor trucks, with their immense loads and high speeds, have made it necessary to change the design of pavement, with the result that our pavements are now not only wider, but heavier and more expensive.

This development of street design has had a marked effect on the distribution of water. With the relatively narrow streets of former days, the logical way to distribute water to the separate lots was to lay a single main at or near the center of the street and to install services from this main to each lot on each side of the street. In many cities these services were installed prior to paving the street, one service being laid for each separate parcel of ground. In other cities, the services were installed as needed, with the result that the cost for each individual service was increased, because of the expense of opening and repairing a pavement.

As street widths increase, a point is reached where it becomes more economical to use a two-main system for water distribution, one main being laid on each side of the street in place of a single main near the center. In the two-main system, the pipe on one side of the street is of sufficient size to provide for domestic consumption and to take care of the fire protection for both sides of the street, tapped however, for services for one side only. The main on the other side is of smaller diameter, usually 4-inch or 6-inch, depending on the length of the line between connections, and unless the street is unusually wide, the main should have no fire-hydrants connected to it. In mentioning these sizes, it is presumed that the width of the street is not so great as to necessitate providing hydrants on both sides of the street. If it should become necessary to have fire-hydrants on both sides, the smaller of the two mains should be large enough to provide water for fire protection as well as for domestic supply. These two mains should be cross-connected about every two blocks and properly valved. Each of these mains should be laid about 4 feet from the lot line, or, if the sidewalks are laid immediately adjacent to the lot lines, it might be advisable to lay these

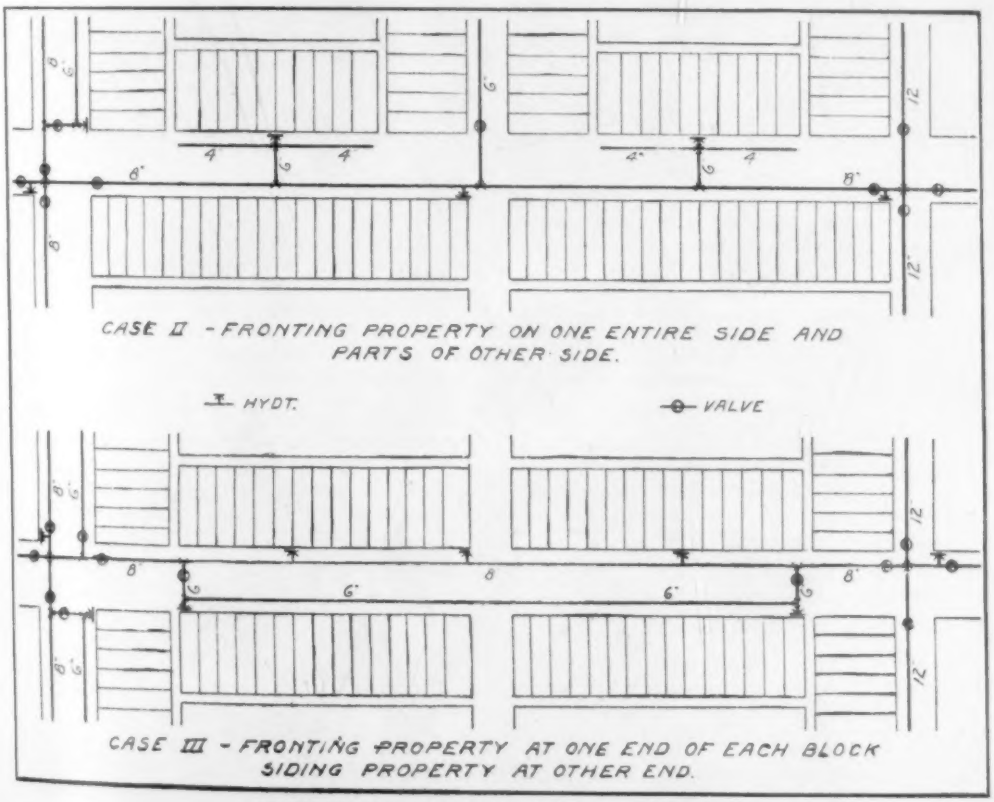
pipes about 1 foot from the outer edge of the walk.

With this type of distribution system, service pipes can be installed when buildings are being constructed. This makes it possible to install a service pipe of the proper size and at the proper location for each building, and does away with the installation of service pipes for each separate parcel of ground prior to paving.

With the old scheme in vogue, many services were installed that were never used, and many that were properly located were not large enough to take care of the size of building that was later constructed. The result is that many dead services now exist in our streets that represent an investment of a considerable amount of money and have never been put to any use. The loss is not limited to money spent in laying these services, since dead services are a prolific cause of trouble, and it often becomes necessary finally to cut them off at the main in order to keep down maintenance costs.

The use of the two-main system also eliminates the necessity of any service pipe crossing the street and puts the mains in parkways, where the cost of digging up leaks is very likely to be less than when pavements must be opened and later repaired. While the use of this system results in a greater mileage of main to be maintained, it cuts down the number and mileage of services to an even greater extent. It also reduces the cost of maintenance by putting the mains inside of the curb, where any leaks that do occur can be easily located without expensive openings and without traffic interference. The removal of water-mains and services from the proximity of street-car tracks, telephone cables, and other possible carriers of return current, will cut down the amount of damage due to electrolysis.

There are cases where it is physically impossible to lay mains inside of the curb lines, as, for instance, when the sub-sidewalk space is vaulted over and used by the property owner. In other cases, rows of trees might interfere with the use of digging machines for installing the pipe, while these machines might be used to advantage if the main were laid in the street. Even in these cases, the actual cost of the two-main system should be estimated by the engineer in order to determine whether or not it would be economical.


CASE II - FRONTING PROPERTY ON ONE ENTIRE SIDE AND PARTS OF OTHER SIDE.
HYDT.
VALVE
CASE III - FRONTING PROPERTY AT ONE END OF EACH BLOCK SIDING PROPERTY AT OTHER END.

DIAGRAMS ILLUSTRATING CASES II AND III

The sketches given indicate several plans for providing services for property subdivided along different lines. In plan 1, we have a wide street with all the lots facing it and supplied by a single main. In plan 1a, we have the same lot layout but supplied from two mains instead of one. In case 2, the lots in the center of the block face the wide street, while the lots at the end face the intersecting streets. In this case a single connection is laid across the street at about the center of the block, and a small main is laid each way from this connection to cover the frontage. The connection across the street could be made large enough to furnish water for one fire-hydrant. In case 3, the lots at one end of each block do not face the street in question; the second main is then laid to cover only the lots that actually face on the wide street.

As an example of the relative cost of the two types of installation, we will assume a street laid out so that each block consists of seventeen 30-foot lots and two 42-foot lots on each side of the street. A roadway of 42 feet is to be provided for. The cost of the single-main system for this street would be:

1,320 ft. 8-in. main installed @ $2.32.....	$3,062.40
2 8-in. valves installed, including basin.....	170.00
76 1-in. lead services (2,280 ft.) including all labor and material @ $1.29 a ft.....	2,941.20
	$6,173.60

The cost of installing a two-main system to supply the same frontage would be:

1,320 ft. 8-in. main installed @ $2.32.....	$3,062.40
1,320 ft. 4-in. main installed @ $1.35.....	1,782.00
2 8-in. valves and valve-boxes.....	100.00
2 4-in. valves and valve-boxes.....	60.00
76 1-in. lead service (228 ft. @ $1.29).....	294.12
	$5,298.52

In this estimate it is assumed that the services in the single-main system would extend to a point 9 feet back of the curb and that in the two-main system each service would be 3 feet long. Under these conditions, the saving in original cost of the two-main system would be $875.08, assuming that all services were laid. In the case of the two-main system, certain services would be omitted because some buildings would occupy two or more lots, and the real saving would consequently be even larger than indicated by the above figure.

As the width of the street increases, the relative saving increases and the costs are also affected by the cost of installing service pipes and by the width of the lots. The case is cited as an example and is not meant to cover all instances. The relative cost of the single- and two-main system will be affected by local conditions, and while the estimate given above may not apply to all cases, it at least points out the economy in using the two-main system.

ACKNOWLEDGMENT.—From a paper presented at the 1926 convention of the American Water Works Association, at Buffalo, N. Y.

Is New York's City Planning Committee Too Large?

THE recent appointment by Mayor Walker, of New York, of a Committee of nearly 500 members on Planning and Survey,* has revived the controversy on the comparative advantage of small and large planning commissions.

As now organized, the New York body has an executive committee, committees on housing, highways, parks, sanitation, traffic, port and terminal, departmental organization, finance, and several secretaries. Such an organization might make a "master plan" for the guidance of the city which would carry a great deal of weight with an intelligent administration. Chicago's City Plan Commission, also a numerous representative body, did just that, and no small commission can point to a finer record of achievement.

But Chicago's Commission had a plan prepared by an eminent staff of specialists. It cost several hundred thousand dollars, and since 1910 several hundred thousand more have been spent on amending the plan and on selling it to the people.

The New York body proposes to spend nothing. For technical advice in plan making it will depend on specialists in other municipal departments and on the reports and recommendations of public and private agencies. Many such suggestions have already been made.

This procedure will hardly produce a master plan. It may and it should produce a careful consideration of many of the pressing physical problems before the city, and out of this consideration should come some definite recommendations. An interesting by-product of the Committee's work, if it works long enough, will be the education of its own membership in city planning. And certainly among the recommendations which such a body would make would be that a permanent city planning bureau with a competent staff and an adequate appropriation should become a part of New York's administrative machinery. It is to be hoped, too, that the larger group will be retained as an advisory commission to the bureau.

The best in city planning, as in government or in anything else, does not come at once. If the present Committee is but a step in the right direction, it is good. The urgent need of planning ahead, the strong interest of both press and public, and the personnel of the Committee and its directorate should keep it free from being a mere gesture.

In New York, as in other cities, it will be found that the ideal planning organization is a small official commission with a technical staff and with a larger non-official group as the educating agency.

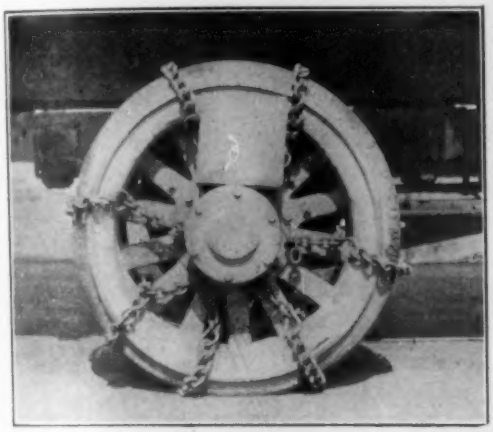
FLAVEL SHURTLEFF,
Seretary, National Conference on City Planning.

* See THE AMERICAN CITY for July, 1926, page 28.

Thin Brick Pavements Studied by United States Bureau of Public Roads

Report of Accelerated Traffic Tests, by L. W. Teller, Engineer of Tests, and J. T. Pauls, Associate Highway Engineer, U. S. Bureau of Public Roads

THERE has been manifest lately a growing belief among engineers that brick less than 4 inches in thickness may properly be used in the construction of pavements. Advocates of the thinner brick have contended that the 4-inch depth is unnecessary and that brick of 3-inch thickness or even less would give equally satisfactory results, and the extensive and satisfactory use of 3½- and even 3-inch brick in some parts of the country has apparently lent support to the contention.



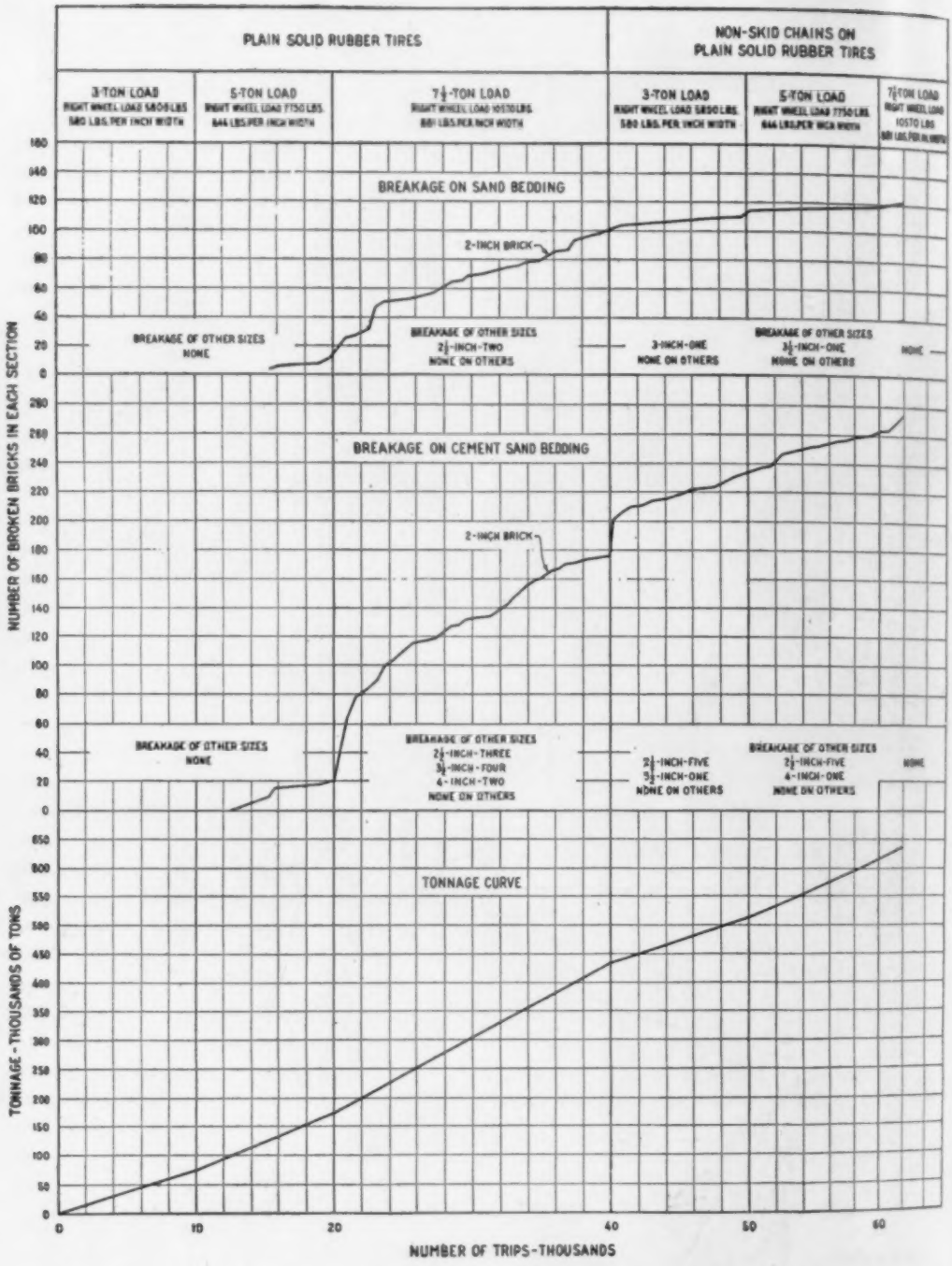
TRUCK WHEEL EQUIPPED WITH NON-SKID CHAINS USED DURING THE SECOND PHASE OF THE TRAFFIC TEST

BRICKLAYER CLOSING IN A "DUTCHMAN" NECESSARY TO COMPENSATE FOR THE CURVATURE OF THE TEST TRACK

If such a reduction in thickness can be made without impairing the service value of the pavement, and if the manufacture of the thinner brick is practicable, the resulting economy in the construction of brick surfaces would doubtless be very considerable; and the question is one which merits thorough investigation on that account. If, as experience has apparently demonstrated, the 3½- and 3-inch thickness can be employed successfully, investigation should confirm that fact and go further to the extent of ascertaining the least thickness practicable from the points of view of manufacturers, service, and costs.

TYPE OF TRUCK AND PLAIN, SOLID RUBBER TIRE USED DURING THE FIRST PHASE OF THE TEST

Recognizing the importance of the question, the U. S. Bureau of Public Roads has undertaken to conduct such an investigation, in the course of which it has made a field study of the service behavior of brick pavements in which brick of less than 4-inch



RESULTS OF THE ACCELERATED TRAFFIC TESTS AS MEASURED BY THE NUMBER OF BRICK IN THE 30-INCH WHEEL STRIPS OF EACH SECTION BROKEN TRANSVERSELY UNDER EACH LOAD IN THE TWO PHASES OF THE TEST

A curve showing the tonnage to which the brick were subjected is also shown

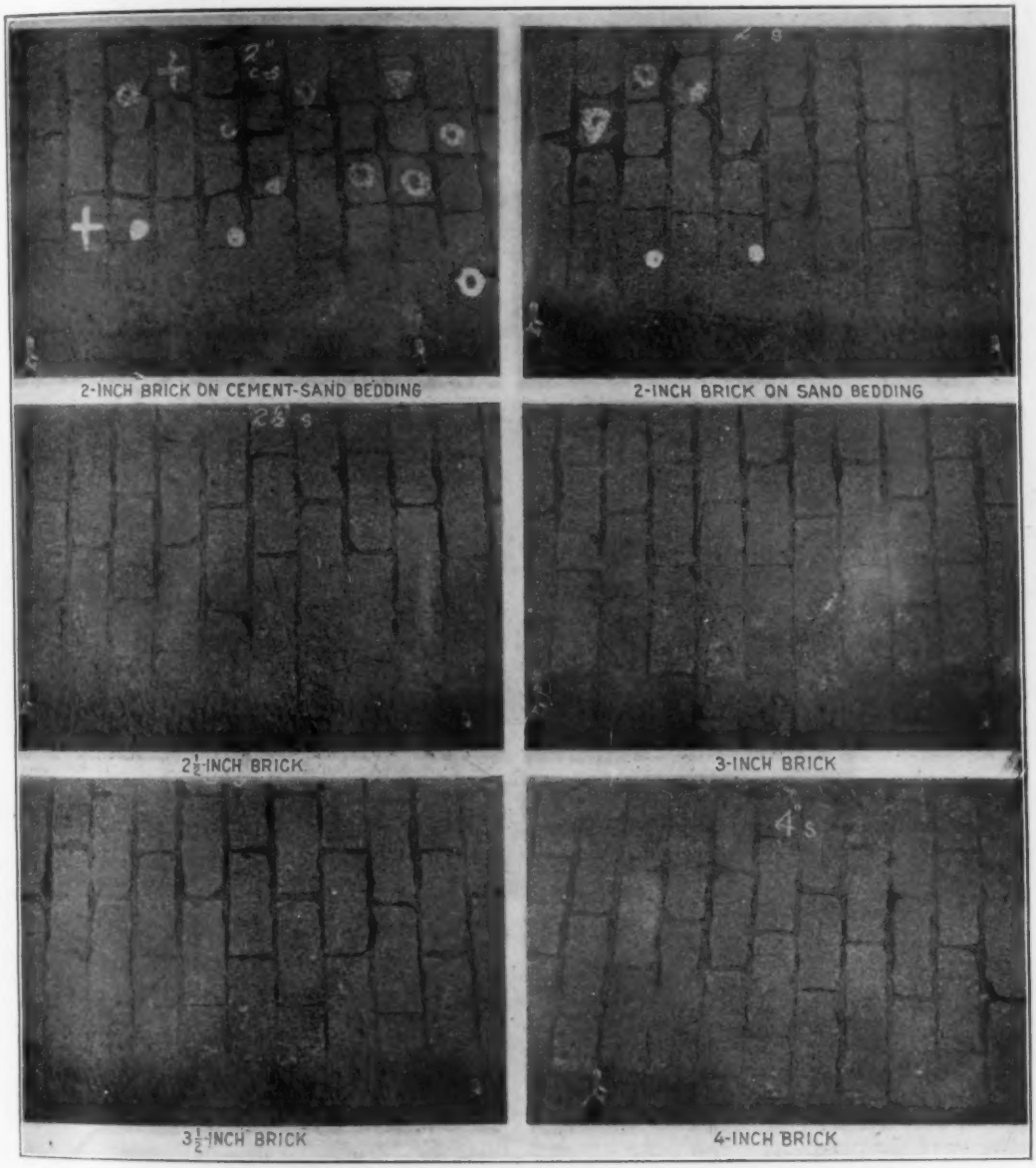
A more complete report of the very thorough investigation of thin paving brick by the U. S. Bureau of Public Roads will appear in the Street Construction and Maintenance Section of the 1927 Municipal Index.

thickness have been used, and concurrently an accelerated traffic test at Arlington, N. J., on sections of pavement built of brick of different thickness and a series of laboratory tests on the brick used to determine their quality. In THE AMERICAN CITY for February, 1926, on page 135, the conditions under which these tests were held were reported. Several plants manufacturing brick of less than 3-inch thickness were visited to determine the attitude of the industry toward the use of thinner brick and to ascertain if their manufacture presents any particular difficulty.

Conclusions Indicated by the Investigation

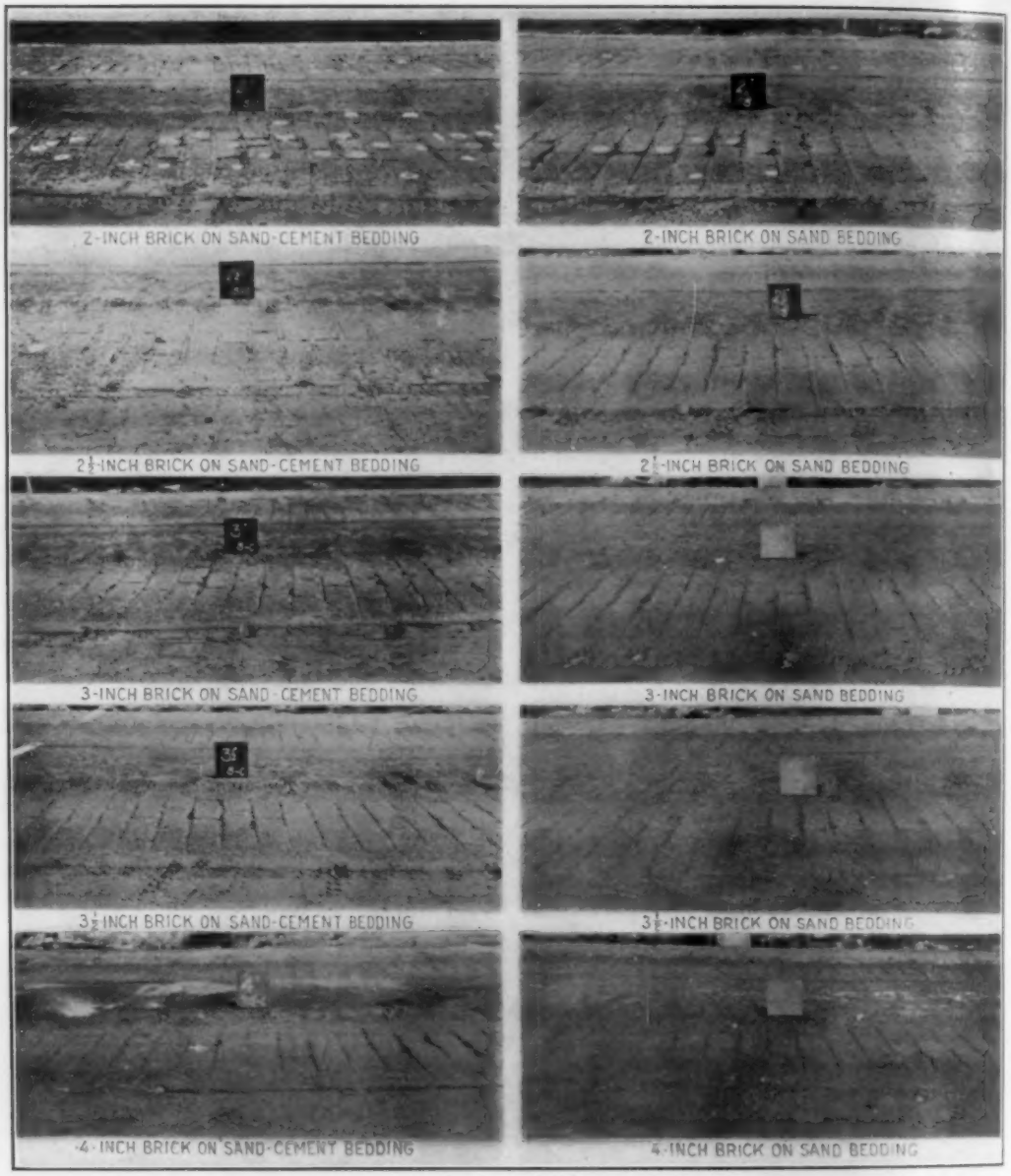
The several parts of the investigation have now been completed and the analysis of the data obtained seem to warrant certain conclusions, among which the more important are:

1. That 2½-inch brick of the quality used



LOOKING DOWN ON THE SEVERAL SECTIONS AFTER COMPLETION OF THE CHAIN-EQUIPPED TRAFFIC

None but the 2-inch brick showed sufficient breakage to justify a conclusion as to the effects of types of bedding. Symbols: (A) solid circles, 10,000 trips with 3-ton load and plain solid tires (in which no breaks occurred) and 10,000 trips with 5-ton load and solid tires, latter caused break; (B) Open circle, A plus 10,000 trips with 7½-ton load and solid tires; (C) Triangle, A plus B plus 10,000 trips with solid tires; (D) Single line, A plus B plus C plus 10,000 trips with 3-ton load with chains; (E) Cross, A plus B plus C plus D plus 10,000 trips with 5-ton load and chains; (F) Open square, A plus B plus C plus D plus E plus 2,200 trips of 7½-ton load with chains


2-INCH BRICK ON SAND-CEMENT BEDDING
2-INCH BRICK ON SAND BEDDING
2½-INCH BRICK ON SAND-CEMENT BEDDING
2½-INCH BRICK ON SAND BEDDING
3-INCH BRICK ON SAND-CEMENT BEDDING
3-INCH BRICK ON SAND BEDDING
3½-INCH BRICK ON SAND-CEMENT BEDDING
3½-INCH BRICK ON SAND BEDDING
4-INCH BRICK ON SAND-CEMENT BEDDING
4-INCH BRICK ON SAND BEDDING

LOOKING ACROSS THE SEVERAL SECTIONS AFTER THE COMPLETION OF THE CHAIN-TIRED TRAFFIC, SHOWING THE BREAKAGE AND DEGREE OF COBBLING

in the Arlington traffic tests, when properly supported, will prove satisfactory for pavements carrying the heavier types of traffic.

2. That brick of 2-inch thickness, when properly supported and of the quality used in the tests, will be adequate for pavements on streets carrying the lighter types of traffic.

3. That a bedding course of plain sand is more effective in reducing breakage of brick than a cement-sand bedding course, the breakage being much less on the former than on the latter. The depth of the sand bedding course should not greatly exceed ¾-inch. Increasing the depth tends to produce roughness in the pavement.

4. That cobbling of the brick is greatly increased as the spacing between the bricks is increased.

5. That the use of excessive quantities of asphalt filler is a common and serious fault in construction, unnecessarily increasing the cost and resulting in a condition which impairs both the appearance and the serviceability of the pavement.

6. That base construction of other than the rigid type may in many cases prove entirely satisfactory. Macadam bases and those constructed of certain types of natural earth appear to be suitable when the local conditions are such that these types of construction maintain their stability throughout the year.

7. That no difference in the base construction is necessary for the different thicknesses of brick.

The Accelerated Traffic Tests

In order to minimize the possibility of a variation in the quality of the brick used, they were all obtained from one manufacturer and all are of the vertical-fiber, plain wire-cut lugless type, 8½ inches long and 4 inches wide, the depths for the various sections being 2, 2½, 3, 3½, and 4 inches.

For the purpose of this test the circular concrete base, 540 feet mean circumference and 13 feet wide, formerly used in tests of bituminous pavement, was divided symmetrically into ten equal sections. On one-half of the circle the plain sand bedding course was laid to a thickness of ¾-inch. On the other half a 1:4 cement-sand course of the same thickness was used. On each type of bedding five test sections were constructed, one of each thickness of paving brick. Each section was about 45 feet long, and between them the change of ½-inch in surface elevation made necessary by the change in thickness of brick was made in a transition section about 10 feet long.

On account of the difference in circumference between the inside and outside edges of the track, it was necessary to give special attention to the manner in which the brick were laid around the circle; and it was decided that the best method would be to lay the brick in a series of short tangents and to join these tangents with "Dutchmen." In the track when completed there was one Dutchman in the center of each test section and another in each transition section, and in this way a uniform width of joints was obtained throughout the entire pavement. Before traffic was applied, the various sections were marked off with radial painted lines, and longitudinal traffic lines were also painted on the surface in order that the truck wheels might be confined to a path 30 inches wide and thus accelerate the test. That the test was truly accelerated is shown by an analysis of the traffic. The plain tire traffic alone amounted to somewhere around seven to eighteen years' traffic on the ten heaviest-traveled highways in Cook County, Ill., and the chain traffic runs up considerably more than one hundred years. The general plan was to apply 3-ton, 5-ton, and 7½-ton motor truck loads a definite number of times on each test section, and to observe the results. The first phase consisted of the application of these loads with motor trucks equipped with solid rubber tires in good condition, as illustrated. In the second phase the trucks were equipped with heavy non-skid chains on the rear wheels, as illustrated.

A study of the graphs reproduced above shows that:

1. Practically all transverse breakage occurred in the 2-inch brick sections.

2. Within the limits of the test, resistance to breakage of the 2½-inch brick appears to have been slightly less than that of the thicker brick.

3. Breakage in sections laid on sand bedding was less than half that occurring in sections laid on cement-sand bedding.

4. The greatest amount of breakage occurred during the application of the 7½-ton load with plain-solid tires.

5. The greatest increase in breakage occurred during the first 10,000 trips of the 7½-ton plain-solid-tired traffic.

6. The rate of breakage greatly decreased under the traffic following completion of the 7½-ton plain-solid-tired traffic.

The high resistance to breakage shown by the 2½-inch brick was one of the important results obtained from this test. The slightly better quality indicated by the physical tests can only partially explain the remarkable strength of this brick under severe conditions. The marked contrast in breakage occurring on the two types of bedding course strikingly demonstrates the superiority of the plain sand over

BRICK OF THE DIFFERENT SIZES TAKEN FROM THE TEST PAVEMENT AFTER TRAFFIC

The group shows the extreme variations in the condition of the brick after the service tests

the cement-sand bedding, at least for the heavy-traffic pavement.

Condition of the Test Pavement After Completion of Accelerated Tests

Although the amount of transverse breakage has been taken as the criterion of the relative service of the several thicknesses of the brick, it must be understood that the transverse breakage alone did not materially affect the condition of the pavements. The broken portions remained in position, and under the plain-solid-tired traffic did not ravel or scale at the cracks except in the 2-inch sections. The number of brick broken during the entire test was less than the number that would ordinarily be broken during the rolling of a brick pavement.

Examination of the pavement after the completion of the plain-solid-tired traffic showed that the damage in all sections was practically limited to transverse breakage. Practically all the cobbling resulted from the operation of the traffic equipped with non-skid chains, and the greater part occurred during the early stages of the traffic. It seemed that after the corners of the brick had become slightly rounded, further rounding took place very slowly. The spacing between the brick appeared to be a controlling factor in the amount of cobbling which took place, and brick laid with a wide spacing consistently showed greater cobbling. Edges of the cracks formed in broken brick were rounded about the same amount as the original edges of the brick.

The condition of the brick in the several sections after the completion of the chain-equipped traffic is shown in the illustration. It will be noted that very little difference is apparent between the condition of the 2½-, 3-, 3½-, and 4-inch brick sections, all being in almost perfect condition at the completion of the traffic test. The sections of 2-inch brick, on the other hand, show marked effects of the heavy traffic.

The estimated saving to cities following the recommendation of the U. S. Bureau of Public Roads Report endorsing the use of vitrified paving brick 2½ inches in depth for heavy traffic and 2 inches in depth for light traffic, is from 15 to 20 cents per square yard for the use of 2½-inch brick over the use of brick 3 inches in depth, depending on the length of the railroad freight haul. Proportionately greater savings are shown in the use of 2½-inch brick over brick 3½ inches and 4 inches in depth. On the basis of shipments of paving brick in 1925 amounting to over 10,000,000 square yards, the use of the 2½-inch brick as a result of this investigation would indicate a saving to the property owners of the country in building their future brick streets and highways, of over a million and a half dollars annually at least.

To Park or Not to Park

To the Editor of THE AMERICAN CITY:

The statement of principles entitled "To Park or Not to Park," in your October number, impressed me as being well stated and of a basic character.

In conjunction with these basic principles governing the larger cities where parking becomes a very serious problem, I think that something should be said regarding the problem in the smaller cities where limitation rather than prohibition of parking is the immediate problem, taking into account the practical considerations that must govern it. I refer, particularly, to the matter of supervision of parking by police officers, by simplifying the necessary supervision to avoid burdensome and impracticable restrictions that would result in limited, if any, enforcement. I suggest that an additional paragraph should be included in this statement of principles as follows:

"Where it is not necessary entirely to prohibit vehicular parking, the limitations upon it should be designed to provide, as nearly as possible, for a normal turnover in the use of the available parking space by the owners of vehicles who have business in the congested district, such as shopping and other short calls, during business hours, and preventing the use of such parking space for all-day storage by business people and persons employed within the congested district. As it is always easier to supervise prohibited parking than short-period parking, this may be accomplished by requiring business men and employees in the business district to seek parking space for their vehicles outside this district or elsewhere off the streets by entirely prohibiting parking in such districts during the hours when they are seeking parking space, and permitting a more normal turnover of parking thereafter by longer period restrictions that are more easily supervised."

In one city, the application of this principle resulted in the recommendation that all parking be prohibited between 7:30 and 9:30 A. M. in the congested business district, and that, following that period, ninety-minute parking be allowed.

EARL J. REEDER,
Engineer, Public Safety Division, National Safety Council.

"With the pedestrian, every year is leap year."

Norwalk, Conn., Finds It Pays to Use Motor Trucks for Refuse Collection

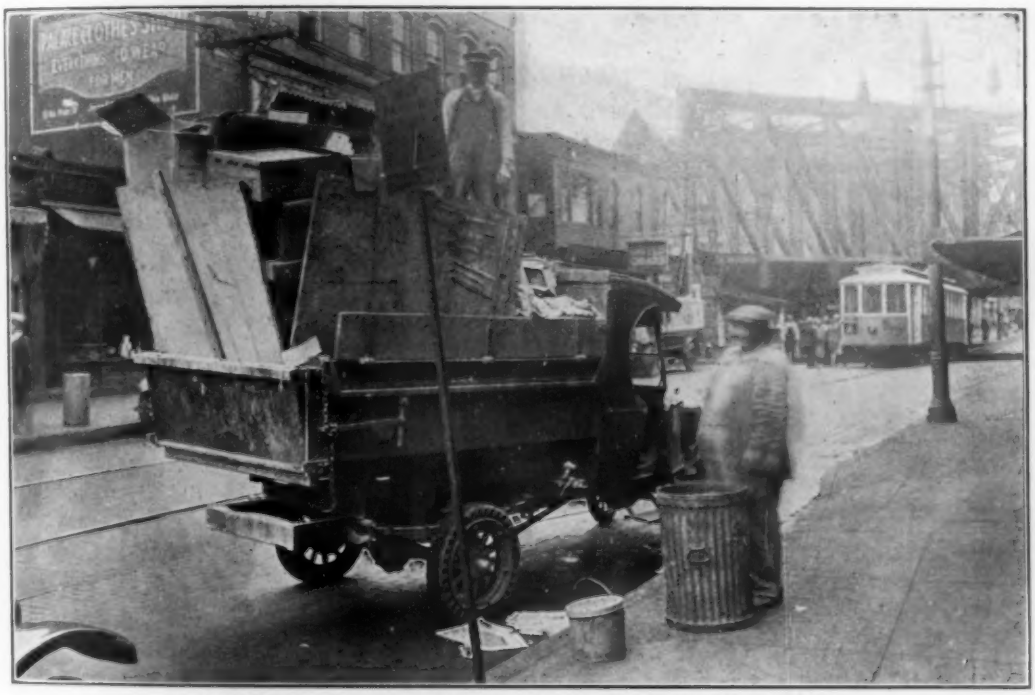
By C. P. Shattuck

NORWALK is a New England city, bordering on Long Island Sound, founded in the 1600's. Formerly there were two Norwalks, that is, two small cities; they are now one, but are still referred to as Norwalk and South Norwalk. There is also an East Norwalk. In addition, there are the suburbs, so to speak, namely, Silvermine, the home of a number of well-known artists and writers; Winnipauk, Rowayton, and Cranberry. There are 15,512 acres, or 24.237 square miles, exclusive of the harbor. The population of Norwalk is about 35,000. The garbage collection routes, however, serve about 20,000.

Like many of the smaller New England cities, Norwalk has followed custom laid down by years of usage when it comes to public service, so for a great many years the removal of garbage and ashes was by the conventional horse-drawn vehicle. Now Norwalk has become progressive and has joined the number of places employing motor vehicles to handle ash and garbage collection and disposal. Use is made of four 1-ton Ford trucks with steel dumping bodies, and these are doing the work of many horses, as is evident from the figures contained in the report of Street Commissioner J. Doman for the last fiscal year.

Garbage is collected daily from the main business streets and twice a week in the residential sections. The containers must be of metal with covers and must not be so large or heavy when filled that two men cannot handle them readily from the curb, where they are required to be placed. Very little trouble has been experienced relative to containers or the curb rule, as the public have cooperated. Of course, there had to be a campaign of education to bring this about. Hotels and restaurants, and other places where the amount of garbage is considerable, have an "enter service"; that is, the collectors enter the building or yard. There are eight zones or routes. These are covered by the four dump-trucks under average conditions, but should there be an abnormal amount, another Ford truck is placed in service.

There are two dumping places for the gar-



COLLECTING RUBBISH ALONG MAIN STREET, NORWALK, CONN.

bage, both quite removed from the residential sections, at least sufficiently so to keep complaints at a minimum. One dump is at East Norwalk, and the other on the road to New Canaan. The East Norwalk dump is a fill. Here the garbage is dumped from the trucks near the edge of the fill and then pushed over and covered with ashes and cinders, a sufficient amount of which is piled up during the winter to cover the garbage. The other dump is isolated, and before it was taken over by the city it was a wild-looking place, covered with the usual refuse. This has been changed, however, and grass is being grown on the completed fill. There are no objectionable conditions to eyes or nose.

Each collecting truck has a crew of three men—two loaders and a dumper. They start at 7 in the morning and work until the work is done. On easy days they are through at 4 in the afternoon, but they often work until 6. Each crew is responsible for the appearance of its truck—in other words, the trucks are kept clean. Wages were $27 a week up to September 1 and are now $30 a week.

It has been the custom to handle garbage and ashes together during the winter, but, beginning this fall, the collections will be separated. The direct supervision of the department is by the Street Commissioner, who has two foremen on the road, using cars. These see that the crews cover their routes, and inspect operations as well as investigate any complaints. The foreman also supervises the work of the caretakers, who level off the fill and are responsible for the appearance of the dumps.

No detailed records are kept of the amount of garbage and ashes handled or of costs per ton or load. The average collection by the horse-drawn vehicles before the adoption of motor trucks was 30 tons daily. The motor trucks are handling approximately 60 tons daily. For the fiscal year ending September 1, 1926, the Board of Estimate appropriated $17,500 for the ash and garbage disposal department. The appropriation for 1927 will be $21,000, which will care for the additional pay of the men. An appropriation has also been made for the purchase of another Ford truck with dump body. Commissioner Doman states that the trucks have been quite satisfactory. The operation and maintenance cost for the year was about $800 for each truck. This, of course, is for oil, gasoline, tires, and parts.

Complaints are very few and when investigated usually show such a condition as a heavy day when the citizen believed he had been overlooked.

ONE OF THE AUTOCAR FLEET WHICH THE TOWN OF HOPEDALE, MASS., HAS BEEN USING FOR SEVEN YEARS

The Hopedale fleet consists of a 1½-, 2-ton and a 4-cylinder Autocar, one of which is illustrated, equipped with a plow

BIRD'S-EYE VIEW OF WINSTON-SALEM'S NEW SEWAGE DISPOSAL PLANT

At the left is seen the Dorr clarifier. Immediately behind the clarifier is the sewage pumping-station and to the right the main disposal plant building, where all machinery, the electrolyzers and the chemical laboratory are housed

The New Electrolytic Sewage Treatment Plant at Winston-Salem, N. C.

By R. Alton Jackson

A NEW $450,000 electrolytic sewage treatment plant has recently been completed by the city of Winston-Salem, N. C., and is now ready for operation. The plant is designed to handle the entire process of treatment, mechanically and electrically, rather than biologically, as the authorities felt that more dependence could be placed on purely mechanical devices than on the uncertain activities of bacterial life. The new plant consists of a main building in which is housed all equipment for the treatment of the sewage, a pump-house where the effluent is pumped from the clarifier to the creek, the Dorr clarifier, and an outdoor transformer station where electric current received at the station at 13,000 volts is stepped down to 550 volts.

Construction of the plant was begun in the spring of 1925 and has just been completed. The present installation has a capacity of 9,000,000 gallons of sewage per day. The plant is large enough, however, to accommodate electrolyzing equipment for a total capacity of 15,000,000 gallons of sewage per day, thus taking care of considerable expansion in Winston-Salem. The plant was designed by Harry L. Shaner, Commissioner of Public Works, Winston-Salem, and R. A. Thomas was resident engineer during construction.

The plant with its present equipment cost approximately $450,000. The new equipment which would be necessary to raise the capacity to 15,000,000 gallons of sewage per day will represent a total cost of approximately $600,000. The plant lies on a tract of land of about 26 acres belonging to the city. It is located about one mile outside the city limits and takes care of sewage from every section of the city.

The main sewage treatment building measures 65½ feet by 141 feet. It is a one-story structure with basement and consists of a brick superstructure with concrete foundation and Barrett tar and gravel roof. In this building is located the main equipment for treating the sewage, as well as the chemical laboratory where frequent tests are to be made. The pump-house is a one-story structure with basement and concrete foundation. The annual cost of operation is estimated at about $30,000. The plant, which is located in an attractive lowland and will be beautified by shrubbery, is protected from high water by a dike built completely around it.

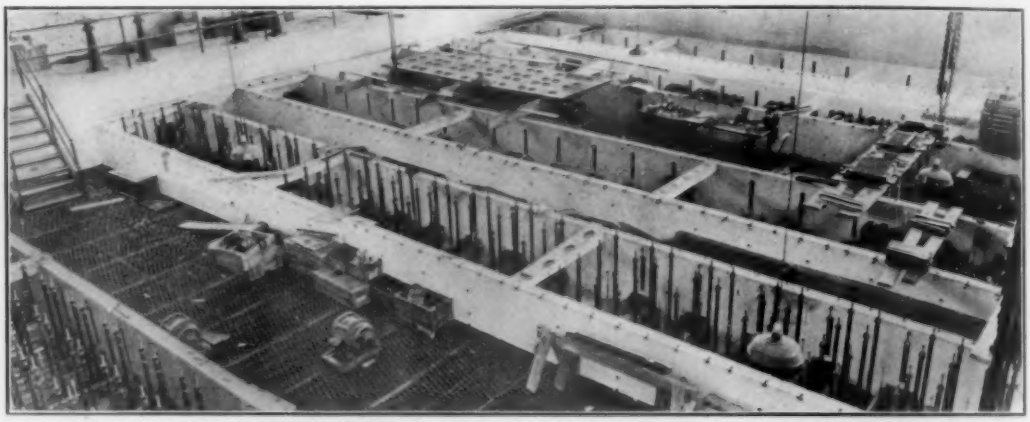
Operation

The method of treatment in this new sewage plant is entirely mechanical and electrical. Upon entering the works, the sewage passes through a screen the bars of which are spaced 2 inches apart and which is cleaned by hand. The sewage then flows to the fine screens, each of which is a hollow rotating cylinder 8 feet in diameter and 8 feet long, with slots 1/16-inch by 2 inches, through which the sewage flows toward the axis, passing through a sealing ring into the screened sewage flume. The screenings fall into a pit below the revolving screens, from which they are removed by an inclined perforated bucket elevator, which discharges them into a metal container fitted with a cover.

The screened sewage flows through a pipe and flume, passing through a General Electric flow meter to the causticizing tank located outside the building. Just prior to its entrance into the causticizing tank, milk of lime is added to the sewage at a rate determined by the flow meter and the condition of the sewerage itself, so as to render it about 30 p.p.m. caustic. The causticizing tank is a specially designed mixing tank of concrete, circular in form, with a hopper bottom, in which the milk of lime and sewage are thoroughly mixed. The detention period in the tank is sufficient for a complete reaction between the lime and the sewage, but the velocity is rapid enough to prevent settling. The addition of lime prior to electrolysis forms a coagulant, which aids in sedimentation and permits the use of iron or steel electrodes, which are not affected by electrolysis in a caustic solution.

bottom level from side to side. The tanks are mounted 6 feet above the floor on columns and are divided into three sections, each of which has a wooden cover. Each unit is equipped with 36 banks of electrodes arranged in two rows, and each bank is composed of 36 steel plates spaced ⅜-inch apart and so connected electrically that alternate plates have the same polarity. In the spaces between the electrode plates scrapers of insulating material are operated with a vertical reciprocating motion imparted by a mechanism located beneath the banks, by means of lifting rods through watertight ball-seated glands attached to inserts cast in the bottom of the tank. These scrapers serve the dual purpose of removing material from the electrode surface and preventing rapid polarization.

The function of the electrolyzer is to bring the sewage into intimate contact with the elec-



VIEW OF THE INSIDE OF THE ELECTROLYZERS DURING ASSEMBLY

The amount of lime required depends upon the alkalinity of the sewage, which, according to average analyses, is 160 p.p.m. expressed as calcium carbonate. This alkalinity, according to the estimate, will require 90 p.p.m. of calcium oxide, which is equivalent to 750 pounds per million gallons, for neutralizing the sewage, and to provide a causticity of 30 p.p.m., an additional 250 parts will be required, making a total of 1,000 pounds of calcium oxide per million gallons of sewage.

After leaving the causticizing tank, the sewage passes into the electrolyzer inlet flume inside of the building, where it may be diverted through any or all of the electrolyzer units to the outlet flume leading to the clarifier or settling basin.

Each complete electrolyzer unit consists of a horizontal reinforced concrete tank extending between and at right angles to the inlet and outlet flumes. Internally the tanks are 5 feet 2 inches wide and 36 inches deep, with the

trodes, where it is subjected to the action of the nascent hydrogen and oxygen produced by the electrolysis of the caustic sewage. By this means unstable organic matter is oxidized and rendered inoffensive, and the colloidal matter is agglutinated.

The sewage arriving at the plant is stale or slightly septic, so that the electrolytic process is especially adapted for its treatment, as it acts upon the unstable organic matter, thus changing the normal foods of putrefactive bacteria so that the sewage becomes inoffensive and will not support putrefactive bacterial growth in the stream into which it is discharged.

Sewage is retained in the electrolyzer approximately two minutes. The motor generator sets furnishing current to the electrolyzers have a rating of 60-40 volts and 300-400 amperes. Tests made upon samples of the sewage at the experimental plant show that the current impressed upon the electrolyzer will vary from 250 to 300 amperes at 2.2 to 2.5

volts per double bank. There are 36 banks in each unit, arranged in two horizontal rows of 18 each. Each of these rows will be connected in parallel, giving a series of 18 banks. The current is thus applied 18 times during the passage of the sewage through the unit and gives the effect of 18 times the indicated amperage.

Leaving the electrolyzer, the sewage with its coagulant flows into a Dorr clarifier through a series of submerged inlet ports. Here the suspended matters settle out, leaving a well-clarified effluent to be discharged into the creek during normal stage. In time of high water the effluent, upon rising in the clarifier outlet flume, operates a series of floats which control the pumping units located in the pumping-station, and the effluent is then forced out against the head of the flood waters.

The settled solids or sludge is continually moved toward the central sludge well in the clarifier by a slowly rotating set of arms carrying a series of plows and is delivered to the sludge drying equipment by means of a diaphragm pump located in the pumping station.

From experiments made at the test plant, the sludge from the clarifier is inoffensive and stable and remains so under all climatic conditions. The sludge obtained from the clarifier is supposed to contain less than 92 per cent moisture and has a maximum capacity of 9,000,000 gallons of sewage daily.

The sludge dewatering equipment is located in the basement of the main building and consists of two automatic filters with cake compressors adapted for vacuum discharge, of the type manufactured by the Filtration Engineers, Inc. The thickened sludge from the clarifier is pumped to a slurry tank located near the filters. The filter is fed from this tank by a pump. The overflow from the filter drains back to the tank by gravity. The capacity of the pump is slightly in excess of the capacity of the filters, so that there is always a rising current in the sludge reservoir beneath the filters.

Each filter consists of a drum rotating on a horizontal axis, the lower part of the drum being submerged in the sludge reservoir. The rotating drum is made of heavy sheet steel divided on approximately one-foot centers by longitudinal division members, so that each one foot around the periphery is in fact a separate filter. From each of these compartments a pipe leads to a control valve, and the steel drum between the division members forms a drainage compartment. Around the entire drum is stretched openwork hose duck somewhat similar to an open burlap, to protect the filter cloth from mechanical wear against the drainage members. The filter cloth is sealed in the division members and around the edges of the drum so that each compartment is positively a separate filter unit.

The control valve consists of a rotating hub into which all of the pipes from the compartments are assembled. A stationary collecting ring surrounds this rotating hub, so that each pipe in its rotation momentarily coincides with ports in the stationary collecting ring. The control valve is so ported that as a compartment dips down into the sludge, vacuum is applied to that compartment, the suction pulling the liquor through the filter cloth and leaving the solids on the outside. As the compartment rises out of the liquor, it passes a bridge, and then the pipe registers with another port where a higher vacuum is applied, so that the moisture in the solids built up on the filter cloth can be extracted to a low figure. As the compartment passes around and descends to the point of discharge, it then passes another bridge, which admits air under atmospheric pressure to the compartment, which releases the cakes on the outside.

The sludge cake, dewatered to 66 per cent moisture or less, is scraped off the filter onto a belt which conveys it to a hopper outside the building. Here it is deposited in cars, and is used as fill or will be sold as a fertilizer.

This equipment is designed to handle the equivalent of 12 tons of dry solids, amounting to 34.29 tons containing 66 per cent moisture, in 16 hours and is guaranteed under bond to give this performance from sludge containing 92 per cent moisture or less in 24 hours' continuous operation.

The sludge when dried is of a light gray color and has a faint mortar-like odor. It contains approximately 70 per cent carbonate of lime and may be used either for filling low areas around the plant or as a soil corrective. The anti-acid properties make it particularly suited for agricultural purposes, and it should have a ready outlet in this field, where its value is about half that of hydrated lime.

ANOTHER CLAIMANT FOR THE DISTINCTION OF PRIORITY AMONG CHAMBER OF COMMERCE BROADCASTING STATIONS

The Chamber of Commerce of Kirksville, Mo., operating Station KFKZ, has been on the air since March 1, 1926. This antedates the opening of the Orange, N. J., and Fort Lauderdale, Fla., broadcasting stations mentioned in the July and August numbers of THE AMERICAN CITY.

Did any Chamber of Commerce antedate Kirksville in the operation of a radio station?

Housing and the Regional Plan

By John Ihlder

Manager, Civic Development Department, Chamber of Commerce of the United States

THE importance of regional planning is equaled only by its difficulties, physical, legal, social. We are here entering a field in large measure new to us and are dealing with factors of which we cannot yet be certain—such as the automobile's effect on transit facilities and the use of the airplane; the selection of open spaces other than parks and public reservations; the government of the metropolitan regions. But it is obvious that we must face these difficulties, for, while we talk, our cities are growing at a rate that promises little short of disaster unless they are guided aright. Some figures recently compiled by the Civic Development Department of the United States Chamber of Commerce show that during the twenty years from 1903 to 1923 seven American cities increased their territory 277 per cent. If this rate of increase were to continue for forty years, these seven cities would cover a larger area than that of the continental United States. Of course this rate will not continue, any more than the population of New York City will continue during the next half-century to develop along the lines of the past half-century—which, according to a witty Columbia professor, would inevitably lead to total depopulation. But in a country whose population is today more than half urban, our failure to deal adequately with urban regional problems, as evidenced by the wholesale annexations cited above, would be a matter of the first importance.

The metropolitan region may roughly be defined as the area within commuting distance of the central or mother city. It may be an area about one or two cities of small or medium size as well as that about a large city. It may at present contain only one or two units of really urban character, the rest of the region being residential sub-urban. But if it does not have other urban units now, it will acquire them later as population increases and neighborhood business districts develop Moreover, in this day, when every chamber of commerce is seeking factories and when factory managements are thinking in terms of industrial distribution, it is almost inevitable that the metropolitan region outside the mother city will develop industrial districts. Consequently, provision must be made in the regional plan for both industrial areas and commercial areas in addition to residential areas. These, normally, will grow into separate towns; and, unless preventive measures are taken, they ultimately will merge into one great city.

The metropolitan region of the future, therefore, will be planned to contain a number of distinct urban communities which will be enabled to preserve their individuality by surrounding open areas. In part, these will consist of parks, some formal, such as Fairmount Park, which today separates Philadelphia from the main-line towns; some natural parks or forest reserves, such as those Boston, Chicago, and other cities are acquiring. But park land alone will not be enough. So much open space

For Stability Rather Than Speculation in City and Regional Development

The accompanying article is a summary of a paper presented at the meeting of the American City Planning Institute held jointly with the City Planning Division of the American Society of Civil Engineers, in Philadelphia, October 7. In his paper the author defined, roughly, the metropolitan region; pointed out the importance of keeping the various urban units in that region separate while at the same time providing for accessibility and communication, and showed the possibilities for improved housing which will result from having workshop and home within walking distance and generous open spaces accessible to all the population.

In this connection the author suggested that main transit routes should become the boundaries of districts or neighborhoods large enough to be in large measure self-sufficing, and pointed out the value of increasing the investment while decreasing the speculative interest in city or regional development. This is a part of the stabilization that we see as one of the results of zoning. But we must recognize that this very stabilization, which we believe will confer such great benefits and do away with such great losses, will itself bring us new problems and so force us to plan more carefully.

is required for the proper ventilation of our cities that a considerable part of it must be devoted to productive uses that will pay its way.

We shall provide adequately for the new kind of harbor that is coming to us with the airplane. We doubtless shall, under stress of necessity, figure carefully how small an air field may be, how high the surrounding buildings may be permitted to rise, for we wish to bring the air-harbor as far in town as possible in order to minimize change in existing values. But, as the railroad induced our river towns to turn their backs upon the levees, so the airplane may induce them to face in a new direction, and those towns which make the most adequate provision are likely to reap a benefit.

But air-harbors, like water-harbors, will prove inadequate to our purpose, and other uses, such as truck gardening and farming, will be found for these open areas.

The better segregation of vocations, which we can secure by intelligent regional planning and zoning, instead of by depending upon the blind instinct which has guided us up to the present, will bring home and work closer together and in smaller urban units. As a result, not only will time of travel—today worse than wasted because of crowded cars that sap the rider's strength and vitality—be reduced, but, because more space will be available, the character of the dwelling may be improved.

Within the region and its units, our problem is to fit our housing so as to give the people of urban America the greatest possible facilities for living abundantly.

A Few Assumptions as to Housing

In order that we may think together on this, I shall start with several assumptions to which I hope there will be agreement:

1. It is desirable to decrease the speculative elements in housing and to increase the investment element until the first has been reduced to the vanishing point and the latter has become controlling. This means that we should stabilize values, and stabilization of house values is dependent upon stabilizing the character of the neighborhood. In this stabilization regional planning, supplemented by zoning, is essential.

2. The preservation of the family—meaning parents *and* children—is essential. The population of voting age may be everything that candidates for public office tell its members that they are, but its life and its work would lose significance if there were no children to carry on. With the children lies the whole future. Consequently, children are of first importance. And since the house is the shell in which the family functions, since it exerts a constant influence in molding and shaping the family, even in determining whether or not there shall be children, the question of housing should be approached from the point of view of the well-being of children.

3. The one-family house with generous open spaces about it is the best house for a child. Consequently, every effort should be made to promote the erection, to protect the continued existence of such houses.

4. While the one-family house is the most important type of dwelling, there is a legitimate demand for other types ranging from the two-family house through the so-called multi-family house and the apartment hotel to the hotel. This demand must be met, but because these socially inferior types of dwellings with their possibilities of land overcrowding and cramped living quarters can under-live the one-family house and drive it out, just as Oriental labor can under-live and drive out white labor, it must be restricted to certain specified sections of the community and must be strictly regulated so that it will provide the essentials of wholesome living—light, air, room space, sanitation—for its inhabitants.

In the old haphazard days we housed a large part of our wage-earning population in the cast-off dwellings of the well-to-do—witness the river wards of Philadelphia. When we have stabilized, when neighborhoods instead of being blighted retain their desirable character decade after decade, we shall have to consider more carefully the provision of inexpensive dwellings. Subdividing large houses into makeshift tenements will no longer let us by. The utilization of one-time mansions as boarding, rooming, and lodging houses will be chiefly of historical interest.

Major Items of Regional Planning

In the regional planning which is to provide the facilities and the setting for our future housing there are several major items that should be mentioned specifically:

1. Open Spaces: These include not only public parks and reservations, but private land. In Europe this problem is being faced boldly, though the result is not yet by any means certain. In the Ruhr the regional administration is saying to private owners, "Your land may never be built upon; you may use it only for farming, forestry, gardening." Even in or near cities such prohibitions are imposed and the owner is told that he may continue to use his land as a private racetrack or athletic field to which admission is charged, or as a garden appurtenant to his dwelling, but may not divide it into building lots. This is analogous to New York's telling the truck-gardeners of Queens Borough, or the corporation of Trinity Church, that the present open spaces they own are to remain forever open spaces; or to Philadelphia's telling the Germantown Cricket Club that its grounds are to remain forever a source of refreshment to the passer-by but not a source of financial profit to the Club. Around some of our large cities today there is more area occupied by private golf clubs than by public parks. Application of the Ruhr policy would assure those cities of more open spaces than they are likely to get by purchase. But it is a question whether the

Ruhr policy will prevail even in the Ruhr; already a case is on its way to the courts.

Manchester in England is attempting to solve the problem in a somewhat different way. The planning authorities propose to select the areas which they believe should remain permanently unbuilt upon—permanently devoted to agriculture, forestry, or similar use—and then pay the owner for the damage to his expectations. This damage, it is believed, will not be large, for if a given farm or woodlot will not be ripe for subdivision for ten or twenty-five years, the present value of the future loss is small. The Manchester method has obvious advantages which I believe will be recognized even in Germany, where a bill to extend to all of Prussia the Ruhr policy has been hanging fire for more than a year.

2. TRANSIT—RAIL, HIGHWAY, ETC.: To this we already are giving much attention, particularly as to future streets and highways. The question is whether we should not go further—plan the routes of future railways and their branches, as is being done in the Ruhr; plan for canals or other waterways where they would be advantageous; perhaps even plan the air-routes which will lead to the air-harbors that we are already beginning to create. And, having planned, provide the means for keeping these routes unbuilt upon. In this connection it is pertinent to ask if we should not reexamine our theory of highway construction. We are prone to accept the results of progressive development. Beginning with the footpath, we have, except in the case of the railway, merely widened it and changed its surface as new means of locomotion were introduced. Our thought has been directed almost exclusively to facilitating movement on the street or highway. Today we are being forced to consider also the effect of traffic upon the character and value of abutting property. Because of this as well as because of the variety of vehicles which use the highway, it may be necessary to begin a classification.

3. WATER: Water used to be considered as exhaustless a natural resource as air. Air long ago became a precious commodity in our closely built cities. Now water is becoming a scarce commodity. We are accustomed to the sight of New York reaching behind its neighboring satellites and appropriating their future supplies, but its recent proposal to draw upon the Delaware will arouse the interest of Philadelphia. Water-supply has become a regional problem that transcends state boundaries.

4. SEWAGE DISPOSAL: The pollution of our streams has made this also a regional problem that transcends state lines.

5. POLICE AND FIRE PROTECTION: We long have been accustomed to seeing one city loan another its equipment for curbing crime or fighting conflagrations; and we long have been accustomed to witnessing the difficulties that followed. Conflict of jurisdiction, hose couplings that do not fit fireplugs, do not belong in an age that claims to be efficient.

6. OTHER SERVICES: Above are given only an indication of the need for regional planning and organization. All of them bear upon housing, even the last, for police and fire protection are of concern to the householder. To them may be added public health work, which loses much of its effectiveness when confined to too small areas; and education, the plants for which must be located with reference to residential areas.

How Assure the Maintenance of Open Spaces?

In conclusion, I wish to emphasize the necessity of finding some way which will be fair to all concerned and which will not impose too great a burden upon the taxpayer, of assuring the maintenance of open spaces additional to parks and other publicly owned recreational reservations. Public parks and reservations will never be adequate to the needs of our metropolitan regions. They must be supplemented by lands which produce an income, but which shall not be built upon. The other problems involved in the development of the metropolitan region—those of highways, water-supply, sewage disposal, etc.—are easy compared with this one. Zoning does not supply the answer, for the basic principle of zoning is, not that it holds a given piece of property permanently in its present status, but that it makes transition orderly. Attempts to use zoning for this purpose directly by establishing an agricultural classification and making agricultural areas permanent would be unfair and would probably be defeated by the courts. Attempts to use zoning for this purpose indirectly, as by designating a given area as residential when the only buildings that would be profitable there would be commercial or industrial, in the hope that this will keep it unbuilt upon, is likely to bring discredit upon zoning, for zoning must be fair and reasonable.

Theoretically, the community might simply buy up all the necessary unbuilt-upon land and then as owner allocate certain parts of it to farming, truck gardening, forestry, air-harbors, etc. Practically, there are not only legal and financial difficulties in the way of this simple procedure, but also the difficulty of administering such properties if they were in public ownership. The last named difficulty, that of assuring honest and capable administration of such properties in public ownership, seems to many people the insurmountable difficulty, though Philadelphia has long owned and managed, through the Board of Directors of City Trusts, the Girard Estate housing properties and coal mines. In Germany the Ruhr Regional Planning Federation is seeking to meet the need by one method. In England the Manchester and District Town Planning Advisory Committee is seeking to do it by another method. What shall be our contribution?

Municipal Diesel Electric Plant Reduces Power Costs

By E. E. Buck
Superintendent of Light and Power, River Falls, Wis.

THE city of River Falls, Wis., located on the Kinnikinnick River, has been operating a hydroelectric power-plant since 1900. From a total of 58 wired buildings in 1902, we have grown so that at the present time there are over 1,000 buildings equipped with electric lights in a city of 2,400 people, and 38 buildings within the city limits are unwired. Until about three years ago two water-wheels of 100-kilowatt and 150-kilowatt capacities furnished all the power required for lighting and power demands as well as street lighting and water pumping, but at times the water became so low that it was necessary to shut off street lights and water pumps.

This condition could not be tolerated, and after some study it was decided that an oil engine of the diesel or semi-diesel type would be most satisfactory for standby service. A De La Vergne diesel engine was chosen.

This new 200-horsepower Type-VG De La Vergne diesel unit operates in conjunction with the hydroelectric plant. The 150-kilowatt water-wheel at the upper dam operates with a head of 48.5 feet, and the 100-kilowatt wheel at the lower dam has a head of 17.5 feet. Under ordinary operating conditions the lower plant is carrying the load at 6 A. M. The diesel is cut in on the line with the lower water-wheel about 7:30 A. M. and operates continuously until midnight. The water-supply in the lower pond usually fails about 1:00 P. M., and the upper wheel is then operated in its place, carrying the load with the diesel plant until midnight, when the engine is shut down. The upper wheel then carries the load until 6 A. M., when the lower plant begins operating. The procedure varies with the load on the plant and the amount of water, the diesel plant operating less than 50 hours in some months and generating more than one-half the power supplied during months of low water.

The diesel engine has been dependable under all operating conditions. At one time it was necessary to run the diesel plant continuously for fourteen days and nights. No trouble was experienced. It was then left idle for nearly a month, at the end of which time it was put on the line in less than three minutes. In emergencies it has been possible to put the engine on the line in less than 60 seconds, making oiling adjustments while the engine was in operation. It has been started just as easily in cold weather as in summer.

DE LA VERGNE DIESEL ENGINE INSTALLED AT RIVER FALLS, WIS.

The engine runs at 277 r.p.m. and is direct-connected to a 250 kv.-amp. 2,300-volt, 2-phase, 60-cycle generator. In the two-year period ending December, 1925, the engine has been called upon for 453,500 kilowatt-hours and has consumed 47,650 gallons of fuel oil of an average gravity of 34 degrees Baume. Hence, we have been able to obtain 9.52 kilowatt-hours per gallon of fuel oil, operating at an average load of 63.6 per cent. At a generator efficiency of 80 per cent this is equivalent to 1 horsepower per 0.445 pound of fuel oil.

Repairs on the engine have been few. Twice each year it is gone over carefully. A spare set of valves and springs are carried in stock so that the valves can be changed without losing the time required for grinding, but it has never been necessary to change the valves ex-

cept as a routine procedure to insure perfect condition. We have not spent over $200 for repairs since the engine was installed.

Savings Over Purchased Power

The annual fixed charges on the diesel plant, including depreciation based on 20-year life, average interest at 6 per cent, and insurance, are $2,294.36. With a station factor of 17.3 per cent, the fixed and operating charges per kilowatt-hour amount to $0.02204, and they are made up of the following:

Fixed charges	$0.01012
Fuel oil	.00748
Operating labor	.00262
Lubricating oil	.00138
Maintenance and repairs	.00044
	$0.02204

The best rate at which power could be purchased when water-power proved inadequate was $0.03 per kilowatt-hour for continuous supply covering the total requirements of the community. The net saving is therefore $0.00796. On the average diesel output of 226,750 kilowatt-hours per year this amounts to $1,804.93 annually.

The De La Vergne diesel engine is not only saving money for the city, but has placed the hydroelectric plant on a solid foundation. It has demonstrated that a properly designed small plant can furnish current as cheaply as a large central station.

OPERATING DATA

Engine—De La Vergne—200 VG—277 r. p. m.
Generator—Electric Machinery Co. 250 kv.-amp., 2,300-volt, 2-phase, 60-cycle
Installed October, 1923, as standby for hydro plant

Factors of operation:
Period—January, 1924, to January, 1926

Station time factor	27.2%
Station load factor	63.6%
Station factor 27.2% x 63.6%	17.3%
Kw.-hr. service demand	453,500
Hours run	4,755.25
Fuel oil consumed (34° Baume)	47,650 gal.
Total cost of fuel oil—47,650 x $.07125	$3,395.06
Cost of fuel oil per kw.-hr. $3,395.06 ÷ 453,500	$ .00748

COST OF DE LA VERGNE INSTALLATION

Foundation, engine, generator, switchboard, oil pump, piping, tank, fire extinguishers, wiring, engineering and labor	$21,629.40
Building (materials, excavating and labor)	3,445.72
Total cost of installation	$25,075.12

COST OF OPERATING 200-HP. DIESEL ELECTRIC POWER-PLANT

Fixed charges:

Depreciation $25,075.12 ÷ 20 years	$1,253.75
Avg. int. at 6%—21/20 x $25,075.12 x .06/2*	789.86
Insurance	250.75
Total fixed annual charges	$2,294.36

FIXED AND OPERATING CHARGES PER KILOWATT-HOUR
(With station factor of 17.3%)

Fixed charges $2,294.36 ÷ 226,750 kw.-hr. per year	$ .01012
Fuel oil $3,395.06 ÷ 453,500 kw.-hr.	.00748
Operating labor 4,755.25 hr. x $.25 ÷ 453,500	.00262
Lubricating oil 20 bbl. x $31.33 ÷ 453,500	.00138
Maintenance and repairs $200.00 ÷ 453,500	.00044
Total costs per kw.-hr.	$ .02204

SAVINGS EFFECTED OVER PURCHASED POWER

Cost of purchased power per kw.-hr.	$ .03000
Cost of De La Vergne Diesel power, per kw.-hr.	.02204
Saving per kw.-hr.	$ .00796
Net annual saving, cost of power on board 226,750 kw.-hr. x $.00796	$1,804.93

*Allowing for interest earned by depreciation reserve.

Utility Company Studies the Future of City's Business District

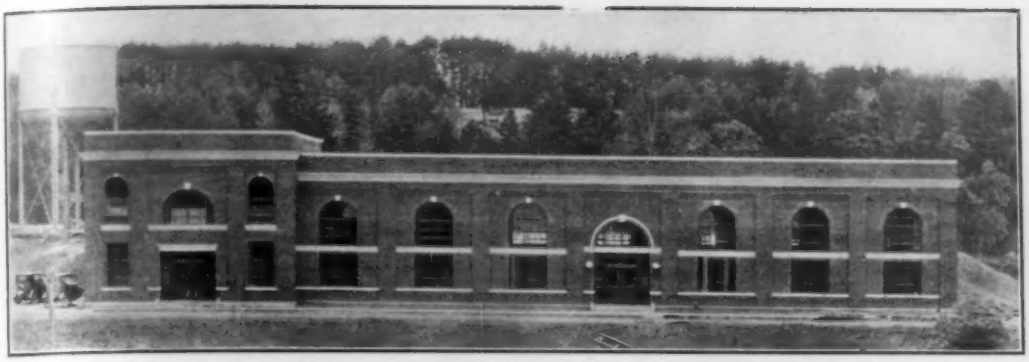
A COMPREHENSIVE economic survey of the future development of the rapidly growing business district of Detroit and of such other outside subcenters as are already taking form is being undertaken for the purpose of securing a fairly definite picture of the growth and needs of the present and future districts for central-station utility service, particularly district steam heating. The period comprehended by the survey will be five-year intervals up to the year 1950. An attempt will be made to visualize the probable building development, block by block, in these areas, taking into account such controlling factors as transportation, traffic, zoning, city planning, land values, living conditions, local trends, industrial employment and output, business population, etc.

The Detroit Edison Company, for which the survey is being made, is thus one of the first to undertake such a far-sighted view of the future, which seems to be particularly necessary in Detroit on account of its rapid growth into a city of the million class. Detroit as yet has no zoning ordinance limiting building heights, as a result of which an 81-story office building is seriously proposed, following upon a 35-story building already constructed.

Detroit is rapidly developing its municipal street railway and bus transportation system and its interurban facilities; has ambitious plans for port development looking to the ultimate building of the St. Lawrence Canal; has already developed a major highway plan for its rapidly enlarging suburbs; and is entering upon active rapid transit development and facilities for transportation by air. Its municipal area now covers 139 square miles, as compared with 28 square miles in 1900, and its population has grown from 286,000 in 1900 to over 1,200,000 in 1925, not including tributary suburban population outside of the city limits. Some important economic questions to be studied are:

- Immediate and future effect of probable zoning restrictions
- Effect of city plan development on building and housing
- Vertical vs. horizontal expansion of business district
- Decentralization vs. centralization of business
- Effect of rapid transit in solidifying or spreading business growth
- Encouragement of new "controlled" business subcenters vs. development of present restricted nuclei
- Study of business evolution and migration and the reciprocal effect of rapid transit and traffic congestion
- Effect of changing living standards in the trend of business districts
- Relation of basic land values in the economic control of future building types, investment and uses
- Evolution of type of central business-building development
- Relation of needs of business to tributary population
- What to do with the "twilight zone" or blighted districts

This survey is being made by J. R. Bibbins, consulting engineer, of Washington, D. C., under the general auspices of the Department of Engineering Research, University of Michigan.



SIX-MILLION-GALLON FILTER PLANT BUILDING FOR SPARTANBURG, S. C.

Spartanburg, S. C., Completes New Water-Supply Project

By H. F. Wiedeman

Solomon-Norcross Company, Consulting Engineers, Atlanta, Ga.

THE selection of the South Pacolet River as Spartanburg's source of water-supply places the city in the enviable position of having a supply which may be progressively expanded to meet the water demands of that community for the next fifty years. The initial installation, which provides a capacity in excess of twice the present consumption, has been completed and is now in operation.

Spartanburg is located in a growing industrial and agricultural section, with a population in 1920 of 22,638, which had grown to over 30,000 at the beginning of the present year. A number of textile plants and the railroads obtain their water from the city's supply. The distribution system is fully metered and the present consumption is 3,000,000 gallons per day.

Former Supply

The original plant consisted of a small impounding reservoir on Chinquapin Creek with a storage capacity of 2,855,000 gallons, which was later supplemented by a storage reservoir of 5,000,000 gallons capacity on the same creek. As the consumption increased, an impounding dam was built on Shoally Creek about 1½ miles from the Chinquapin supply, and the raw water was pumped over a ridge to the Chinquapin reservoir. Later, as the demand again increased, a raw-water pumping-station was established on Lawson's Fork, near the Shoally Creek supply, and this was also pumped into the Chinquapin reservoir.

The water was taken by gravity from the Chinquapin reservoir, treated with lime and alum in the original storage reservoir, which had been converted into a coagulating basin, and then passed into a small secondary coagulating basin. From this basin, the water passed through a filter plant containing eight wooden tub filters of 500,000 gallons per day each, and was then sterilized with chlorine and discharged into an open clear well of 750,000 gallons capacity, from which it was lifted by steam and electric pumps to the standpipe and distribution system.

The filter equipment was antiquated and without proper control and there was not sufficient storage to provide for peak loads, which resulted in the frequent operation of the filter plant at over-load. Notwithstanding the fact that the usual modern means for the control and operation of the plant were lacking, the water supplied to the consumer was at all times clear and free from B-Coli, as shown by the operating records. The explanation, of course, is that the operation of the plant was in the hands of men who were conscious of their obligation to furnish the citizens a safe and satisfactory water with the equipment available, no matter how laborious and difficult the task might be.

Reasons for Change of Supply

In 1923, the Commissioners of Public Works were confronted with the necessity of providing additional facilities to meet the increasing water consumption due to the increase in population and industrial activity.

A thorough study of the existing plant revealed: that the major portion of the plant was rapidly approaching the end of its useful life; that the location and topography was such that economical extension was impossible; that the increase of industries and population on the watersheds of the source of supply was rapidly assuming dangerous proportions; and that it would be possible to make alterations and additions which would put the plant in condition to meet the demands for the next five years, but that a new source of supply should be decided upon and the necessary steps taken to purchase the required property and to arrange for the financing of the construction, so that the new plant would be ready when needed.

ized that it would be necessary to move the plant in any event, and that the car repair shops were an asset which the city could ill afford to lose because its location interfered with an almost obsolete water-supply.

Plans for the new work were drawn and contracts were let in May, 1925.

General Plan of Development

The general plan of development was to construct a dam across the river about eleven miles from the city, and a filter plant below the dam, which would take water from the dam by gravity. The minimum recorded flow of the river at the dam is 20,000,000 gallons per day, and the average flow approximately 70,000,000 gallons per day. The topography is such that

COMPLETED DAM WHICH WILL FORM A LAKE OF 350 ACRES WITH 19 MILES OF SHORE LINE
The water in front of the finished dam will be 50 feet deep. The dam has a 320-foot spillway and contains 7,200 cubic yards of concrete

Future Source of Supply Chosen

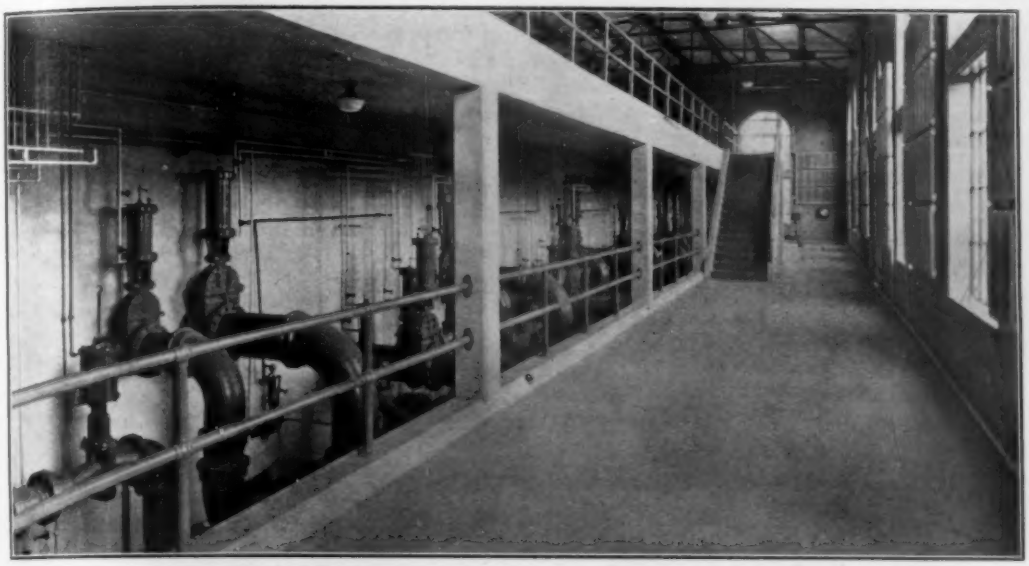
Of all the supplies investigated, the South Pacolet River was chosen because of the remoteness of its watershed and the small population on it, the relatively high run-off as compared with other streams during periods of dry weather, and the topography between it and the city, which made economical construction and operation possible.

It was decided to purchase the necessary land and flood rights and construct the plant later, but at this time the Southern Railway announced that it would build a large car repair shop near the city, and chose for its location a plot of ground which was on the drainage area of two of the city's sources of supply. The location of the shops and the industrial village which would necessarily follow, upon the drainage areas, caused the Commissioners to act at once toward developing the South Pacolet River supply. It was real-

a total head of 63 feet is available, and a small hydroelectric plant was constructed to utilize the excess water. More power will be generated than is necessary to pump the water required, and the excess power is sold to a local power company at the city's switchboard.

Dam and Storage Reservoir

The dam is of the Ambursen hollow reinforced concrete type with full concrete apron, having an over-all length of 450 feet and a height of 45 feet above normal water surface, and contains 6,500 cubic yards of concrete. Flash boards 3 feet high are placed on the dam. The reservoir created by the dam floods 315 acres and has a total storage capacity of 1½ billion gallons, 900 million gallons of which is in the upper 15 feet and is available for draw-down. The reservoir was cleared of all trees and brush, but was not stripped, because it is believed that aeration at certain



FIRST FLOOR AND PIPE GALLERY OF THE SPARTANBURG, S. C., FILTER PLANT

seasons of the year will successfully remove odors and tastes caused by decaying vegetable matter.

The buttresses of the dam are founded upon a relatively soft granite, but the cut-off trench is in hard blue granite, which acts as an effective seal against leakage.

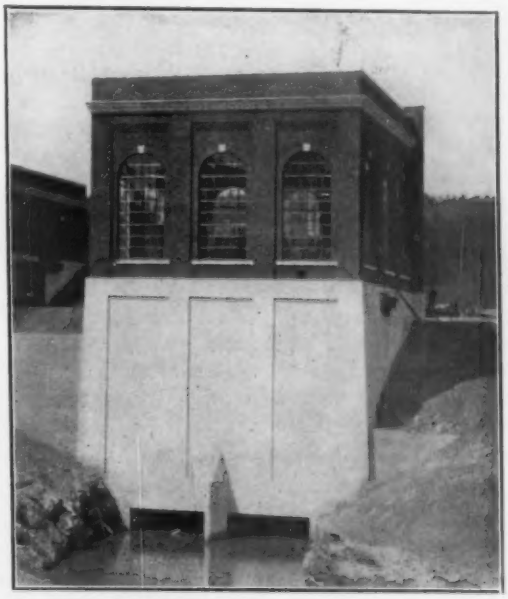
Power-House

Below the dam the river-bed falls 17 feet in a series of shoals, and the power-house is located about 1,200 feet below the dam near the last shoal. Water is conveyed to the power-house through a 78-inch steel penstock, which is divided into two 54-inch penstocks at the power-house, to supply water to two units. A small differential surge tank is placed at the end of the 78-inch penstock to protect it against excessive pressures due to change in load. The penstock is controlled by a 5 x 7-foot sluice-gate at the dam and by two 54-inch hydraulically operated gate-valves at the turbines.

In the power-house are installed two 750-horsepower vertical S. Morgan Smith turbines, with steel scroll cases, equipped with 5,000 foot-pound Lombard governors. These turbines are direct-connected to two General Electric generators 400 r.p.m., 2,300 volts, 625 kv.-amp. at 0.8 power factor. The exciters are direct-connected.

The power-house also contains three two-stage DeLaval centrifugal pumps of 2,700 gallons per minute capacity when operating against a total head of 300 feet. The pumps are direct-connected to 300-h.p., 2,300-volt General Electric motors, and are primed by water ejectors connected both to the high-pressure mains and to the penstock.

The switchboards are arranged so that power can be given to or received from the power company, or that power may be supplied to the pumps and the filter plant, and the excess given to the power company. A 33,000-volt transmission line has been built to the



POWER-HOUSE AND PUMPING-STATION EQUAL IN HEIGHT TO A SIX- OR SEVEN-STORY OFFICE BUILDING

This station contains two 750-horsepower generators and three 4,000,000-gallon centrifugal pumps

plant by the power company and the necessary transformers installed. It is expected that 2½ to 3 million kilowatt-hours of energy in excess of pumping requirements will be available for sale each year, at the present rate of water consumption.

Filter Plant

The filter plant consists of six units of the conventional type of 1,000,000 gallons daily capacity each, built in a continuous line with an open pipe gallery. Under the filters is a clear-water well of 750,000 gallons capacity.

There are two concrete coagulating basins having a retention period of 6 hours at a 6-million-gallon rate, which are preceded by a mixing chamber of the over-and-under baffle type, having a retention of 30 minutes at the 6-million-gallon rate. The mixing chamber is divided into three compartments for flexibility. Wash water is supplied from a 75,000-gallon steel tank on a 25-foot tower, through a 16-inch pipe line. The wash-water tank is connected to a 300-gallon-per-minute, motor-driven centrifugal pump, which takes suction from the clear well, and also to the high-pressure mains for emergency supply. All water entering the tank is metered.

Lime and sulphate of alumina are fed to the water as it enters the mixing chamber by dry feed machines. Raw water is supplied by gravity to the plant through a 24-inch cast iron pipe connected to the penstock, and the water-level in the basins is controlled by a 12-inch hydraulically operated valve equipped with Simplex control mechanism. Chlorine is applied to the water as it passes from the filters to the clear well.

Supply Mains and Clear-Water Reservoir

The filtered water is pumped from the well under the filters through a 24-inch cast iron pipe line 15,000 feet long, to a 3-million-gallon covered circular reservoir of the ring tension type, which is 240 feet higher than the pumps. A Venturi meter is installed in the line at the filter plant. At the reservoir there is installed a Gurley electric water-level gage, which is connected to an indicating and recording register in the filter plant.

From the reservoir the water flows by gravity through a 27.56-inch diameter cast iron pipe line to the city. This line was originally designed as a 30-inch line, but for economical reasons it was found advisable to use this odd size which one of the foundries was able to supply. Since there will be no connections to this line except those already installed, and replacements are available to provide for breakage, no difficulty is expected because of the odd size. To make the pipe lines readily accessible, the gravity supply line for its entire length and the major portion of the force main are laid in a top-soiled highway which is maintained by the county. The minimum cover is 2½ feet.

The gravity main has a maximum capacity of 10 million gallons per day. A steel standpipe of one million gallons capacity will be constructed near the city to provide a supply in case of a break in the supply main and to regulate pressures and provide for peak loads when the consumption begins to approach the capacity of the line.

A. Phelps and Sons, Knoxville, Iowa, were contractors for the dam and power-house, Tucker and Laxton, Charlotte, N. C., were contractors for the filter plant and pipe lines, the Rome Contracting Company, Rome, Ga., were contractors for the high-level reservoir, and Burford, Hall and Smith, Atlanta, Ga., furnished and installed the power and pumping machinery.

The Commissioners of Public Works are: D. W. Hendrix, Chairman, C. L. Cannon, and W. R. Dillingham. R. B. Simms, is Superintendent of Water-Works. The late Paul H. Norcross was consulting engineer until his death in the Norman boat disaster at Memphis, May 8, 1925, at which time contracts had been let. The work has since been carried on by his successors, the Solomon-Norcross Company. The writer was in charge of the design of the plant and acted in a general supervisory capacity during its construction. George W. Hackett was resident engineer, with Lowell Cady as his principal assistant.

A Comment on New York State's New City Planning Law

(See THE AMERICAN CITY for June, 1926, pages 671 to 674)

It is a triumph of keeping at it and of the utmost importance in results. In the Borough of Richmond, we made attempt after attempt along similar lines, through ordinances and proposed laws (1902 to 1913), but never could get even sympathetic consideration of our drafts of laws. Moral suasion secured some results on the same lines, but now the law bites, and real estate operators, like the coon, are coming down from their lofty perches. The trouble still is in Queens and Richmond that the "City Plan" is far from complete, so many makeshift layouts must inevitably still be developed.

—L. L. TRIBUS.

New Rapid Sand Filtration Plant, Washington, D. C.—Part II

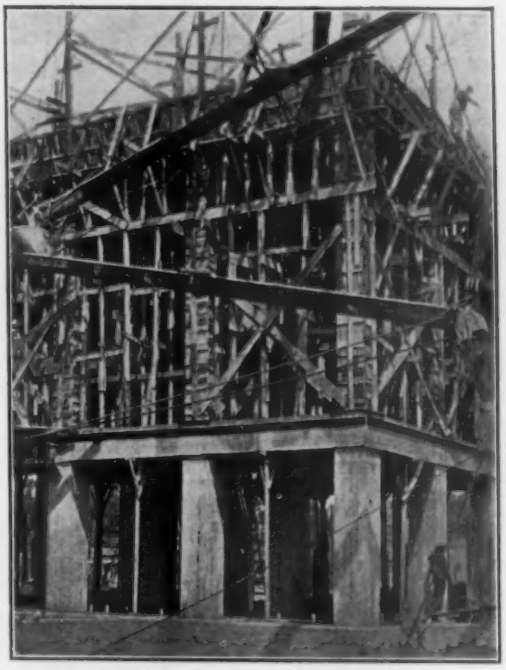
By Philip O. Macqueen

United States Assistant Engineer, Washington, D. C., District

Filter Building

THE filter building is 361 feet long and 155 feet wide, and contains 20 filters arranged in two parallel rows of 10 each, separated by a central pipe gallery. Each filter is a rectangular concrete structure 54 feet long, 31 feet wide, and 15 feet deep, with a net sand area of 1,477 square feet. Using the rates of filtration of 125 and 150 million gallons per acre per day, the filter capacities are 4,238,000 and 5,086,000 gallons per filter per day, respectively. The filters are considered as 4,000,000-gallons-per-day units, but it is recognized that 5,000,000 gallons per day is not by any means excessive, and controllers, piping and equipment have been designed for flows varying from 1,000,000 to 6,000,000 gallons per day. Taking into consideration filters out of service and wash-water demands, the maximum net output of the plant may be safely taken as 80,000,000 gallons per day. Each filter will be equipped with one 20-inch Simplex rate controller and five Rensselaer hydraulically operated gate-valves.

The strainer system used will be of the new open wooden slat type similar to that now being installed in the new Baltimore plant. The slats will be 1 x 8-inch yellow pine, spaced so as to allow openings of 1 inch between the slats. Below the strainer system there will be a shallow water passage 24 inches deep in the center and approximately 6 inches deep at the sides of the filter. This cross-sectional area, amounting to about 35 square feet, will give adequate opportunity for wash water to exert an equal upward current over the entire area of the filter. Wash-water gutters are of concrete and are spaced 6 feet 9 inches center to center, and 4 feet in the clear with the main gutters on one side of the filter. Gravel and sand will be 18 inches and 30 inches deep, respectively. The top of the sand will be 21 inches below the top of the gutters, thus allowing for a vertical velocity of wash water of 2 feet or more per minute. Consideration has been given to providing adjustable brass or wooden plates on the sides of the lateral gutters so as to wash at higher velocities if found advisable. The tops of the filters have center walks and three crosswalks, so that any part of the filter can be inspected with perfect ease. These walks are so generous in size that the usual railing between filter tops and central operating floor will be omitted and visitors will be allowed to walk in any place in the filter building.



HEAD HOUSE TOWER, WASHINGTON FILTRATION PLANT, ABOUT ONE-THIRD COMPLETED HEIGHT

Pumping-Station

The pumping-station, which is directly connected to the north end of the filtration plant group of buildings, contains nine electrically operated pumps which are used to force water to various high-service reservoirs in the city. The building is 100 feet long and 46 feet wide, with a 46 x 20-foot wing on one side for housing the switchboard and electrical equipment. All the pumps are placed low enough so that negative suction heads will be eliminated under normal operating conditions. Discharge pipes and valves are in a sub-basement under the main pump floor, so as to improve the architectural appearance of the interior of the pump room. The filtered water reservoir is on three sides of the pumping-station, and the mixing basins

are on the fourth side, so the building is entirely surrounded by water.

Water flows to the pumps through a concrete suction well which connects directly to the filtered water reservoir, and branch concrete suction chambers 3 feet wide and 7 feet deep lead off at right angles from the suction well to the various pumps. Maximum velocities in these passages are less than 3 feet per second, so that the loss of head is extremely small. After leaving the pumps, the water is forced into three separate cast iron discharge mains, which pass through the filtered-water reservoir on the way to the high-level reservoirs. The largest of these discharge mains is 48 inches in diameter and it is necessary to anchor it to the concrete floor of the reservoir with steel straps to keep it from floating when empty. The other 36-inch, class D, cast iron discharge pipes are heavy enough to avoid the necessity of anchors.

Data on the sizes and capacities of the pumps are shown by the following table:

Data	1st High Service	2d High Service	3rd High Service
Number of pumps	3	3	3
Normal capacity m. g. d.	18	10	10
Maximum capacity m. g. d.	22	12	12
Average operating head (feet)	155	235	340
Motor horsepower	615	510	770
Speed, revolutions per minute.	1200	1200	1200
Guaranteed over-all efficiency.	79%	78.9%	79.2%

The pumps will be of the horizontal, volute type with a single stage for the low lift, and two stages in series for the two high lifts. The motors will be of the self-starting, synchronous type, designed to operate on a 3-phase, 60-cycle, 2,200-volt circuit at 100 per cent power factor. The pumps were built by the Worthington Pump & Machinery Corporation, and the motors by the Westinghouse Electric & Manufacturing Company.

Filtered Water Reservoir

After leaving the filters, the water passes through a concrete duct 4 feet 9 inches high, 9 feet 6 inches wide, and 250 feet long, to the filtered-water reservoir, which is located on the northeast side of the plant. The reservoir is a covered concrete structure with a storage capacity of 15,000,000 gallons, acting as a local balancing factor between the filters and pumps. The water enters the reservoir near the pumping-station, but will be forced to circulate by baffles in such a way as to avoid dead water.

The shape of the reservoir is quite irregular, with a maximum length and width of about 400 feet, and an average depth of 20 feet. The outside walls were built to follow the contours so as to avoid, as far as possible, any construction on filled ground. The roof is of the flat slab type, 9 inches thick, with a four-way system of reinforcement. The columns are circular in shape, 24 inches in diameter, and spaced 16 feet 6 inches center to center. The side walls are constructed with a heavy gravity section, and the floor is of the inverted groined arch type, 6 inches thick at the low point and 18 inches thick under the columns. The floor joints are sealed with 6 x 24-inch concrete blocks, with the top surfaces and vertical joints coated with plastic cement.

The reservoir operates on a somewhat different principle from that of the average filtered-water reservoir. The maximum flow line is on a level with the tops of the filters, so that when the reservoir is full the filters automatically cease to operate. As the water-level in the reservoir drops, the filters begin to operate and gradually attain a maximum capacity, when the reservoir drops down to or below the level of the filtered water effluent, which acts as a water seal for the controllers. Operation of the reservoir in this way will not only effect a considerable saving in the cost of pumping, but will tend to simplify the joint operation of the pumps and the filters, as, if the pumps are slowed down, the water in the reservoir will rise and force the filters to slow down.

The capacity of the reservoir below the water seal of the controllers is only about 50 per cent of the full capacity, but as Washington has four other large filtered-water reservoirs in other parts of the city, the decreased capacity of the reservoir at the plant is not a material loss to the general filtered-water storage system. Smaller cities with a single filtered-water reservoir would be unable to operate in this way. Venturi water-meters made by the Builders Iron Foundry are placed on the three discharge lines from the pumping-station, also on the raw-influent conduit, the filtered-water effluent conduit, and the wash-water reservoir effluent.

Ducts Largely Replace Pipes

Rectangular concrete ducts or passages, instead of large pipes, are used for conveying the water through the filtration plant. These ducts are from 8 feet to 10 feet wide, and from 5 feet to 12 feet high, with walls 12 inches to 15 inches thick, and as a rule the ducts are placed one above the other for compactness and economy. Expansion joints with steel plate water stops are provided throughout at intervals less than 50 feet apart, and the inside surfaces of all ducts will be waterproofed with one of the special compounds for concrete protection now on the market. The ducts are heavily reinforced for positive and negative stresses for

all loading conditions and also for temperature strains.

Some doubt has been expressed by the sanitary engineers as to the advisability of having raw water and filtered water separated by relatively thin concrete walls. Consideration was given to this question, but the writer can hardly see how it would be of much importance, on account of the extremely small leakage possible and the relatively large quantities of water involved. All multiducts will be thoroughly tested under full water pressure conditions before being finally accepted.

Wash-Water Reservoir

The wash-water reservoir is a covered concrete structure 66 feet long, 35 feet wide, and 12 feet deep, with a capacity of 200,000 gallons, and it will be located on the side of a small hill directly east of the filtration plant. As the base of the hill is only 300 feet from the filtration plant and it rises to an elevation of several hundred feet above the filters, it provides an ideal situation for the reservoir. The flow line of the reservoir is 54 feet above the tops of the filter gutters, and it has been calculated that this will provide ample head under full flow for washing the most distant filter.

A 12-inch pipe connected to the discharge of the first high service is used to fill the reservoir, and a 30-inch cast iron pipe 1,200 feet long conducts the wash water to the filters. An automatic float valve will be used to keep the wash-water reservoir full at all times. The roof of the reservoir is covered with two feet of earth, and the slopes are terraced so that the finished structure will be entirely out of sight and thoroughly protected from contamination or freezing.

Coagulant

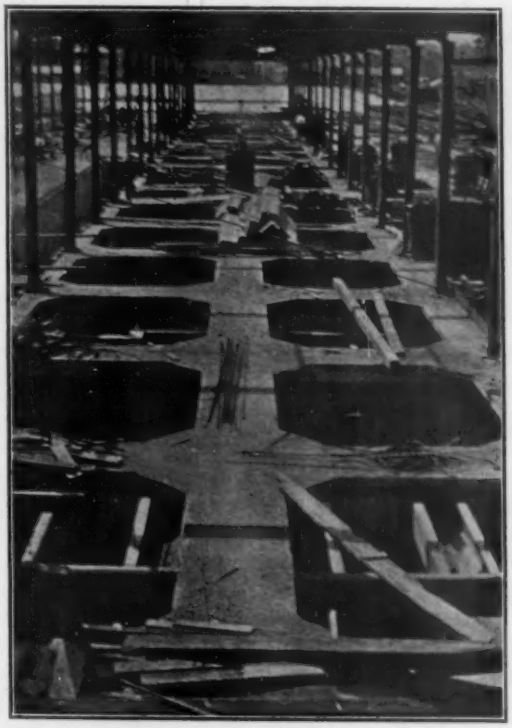
Syrup of alum will be used as a coagulant, and this material will be manufactured at the filtration plant, by the Hoover process, out of bauxite and sulphuric acid. A careful estimate, including cost of raw materials, preparation, and also interest and depreciation, indicates a saving by this process of about 20 per cent in the cost of chemicals. Ability to control the acidity of the alum syrup, is, however, counted upon as being of more importance than the difference in cost of materials.

Bauxite will be transported to the plant by motor truck from a railroad siding half a mile away. After being crushed and pulverized, it will be lifted by vacuum to the storage bins in the tower of the head house. From these bins it will be drawn off as required to lead-lined boiling tanks.

Sulphuric acid will be stored in an underground vault near the head house, and will be lifted to the tanks by compressed air. The manufacture of one ton (2,000 pounds) of aluminum sulphate will require about 700 pounds of bauxite, 1,100 pounds of 60 degrees sulphuric acid, and 200 pounds of water. Auxiliary equipment, such as automatic scales, acid fume scrubbers, and dust-collecting equipment, will be used to facilitate the work and to keep the alum plant clean. After the syrup is made, the solution will be diluted and fed to the raw water through controllers. One of the storage bins will be used for a supply of crystal alum for use in case of necessity. Cake alum will not be manufactured at the plant.

Hydroelectric Plant

The hydroelectric plant is located at the foot of a steep bank about 1,000 feet away from the filtration plant. Water pressure for operating the turbines will be obtained from the surplus supply from the aqueducts, which will amount to a maximum of 200 cubic feet per second under a net head of 130 feet. Electrical equipment in the power-plant will consist of two horizontal 1,200-kw. generators delivering 3-phase, 60-cycle, 2,200-volt current. The power-plant will be of the remote control type,



WASHINGTON, D. C., FILTRATION PLANT UNDER CONSTRUCTION, MAY 21, 1926

fully equipped with all safety devices, and will be operated from the pumping-station switchboard at the filtration plant. Standby service connections with a local power company have been made in case of a breakdown in the power-plant. The cost of local electric power is about 1 cent per kw. hr., and the cost from the new power-plant will be ¼ of a cent per kw. hr., which will mean a saving of approximately $100,000 per year. The power-plant will furnish sufficient energy for all requirements of the filtration plant and pumping-station.

Architectural Treatment of Plant

The filtration plant is located in a residential section of Washington and also in a locality which will eventually be adjacent to an extensive parkway. For this reason unusual attention was given to the architectural features of the group of buildings. Many studies were made and the type finally selected was that known as the American Colonial. Familiar examples of this type of architecture constructed about a hundred years ago, in dark red brick with white wooden gables, are found in nearly all Southern cities. The plans were examined and approved by the Fine Arts Commission of the National Capitol, who made many valuable suggestions.

The walls of the building are constructed of light red and brown brick of variegated colors, comprising the full range of the kiln. The fire flash brick are almost black in places and lend a pleasing variety to the wall. The main walls are composed of one layer of face brick backed up with 8 inches of interlocking tile, with a 1-inch air space for insulation. The roof will be of variegated Vermont slate, and the gabled wooden cornices will be painted a Colonial ivory color. The windows will be of the steel casement type, painted to match the cornice. In order to obtain the exact appearance of brick work desired, a large sample wall 10 feet high and 20 feet long was erected on the site of the work, and the contractor was required to use this as a model for color and bond.

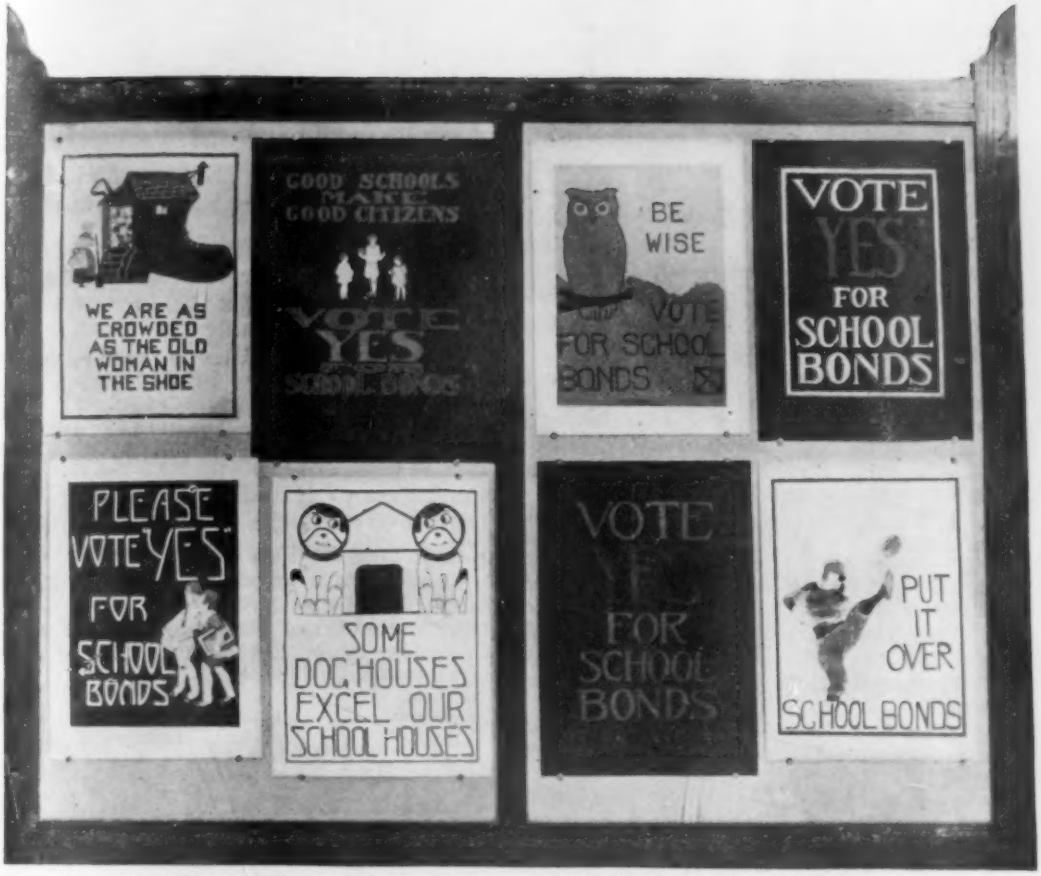
The more important interior floors in the buildings will be covered with a light red and tan-colored pottery tile, and the walls and ceilings will be covered with a substantial cement plaster selected especially for its durability and light-reflecting qualities. The filter building, which is 361 feet long and 155 feet wide, will have an exceptionally bright and well-lighted interior. Ceilings and columns will be white, floors and main passages will be of red tile, and filter tops will be finished cement. This treatment, together with generous window and skylight facilities, will make the room the best-lighted, perhaps, of any filter building yet constructed. The interior treatment of pumping-station and head house will be similar in general to the filter building. Pumps and motors will be painted white. Baseboards and stairs will be dark slate, and a substantial glazed tile will be used for walls of rooms containing chemical manufacturing and feeding equipment.

The expense of this architectural treatment has added somewhat to the cost of the superstructures, but it is considered justifiable on account of the location of the filtration plant at the National Capitol and the consequent increase in the number of people who will visit it. The materials were selected for durability as well as beauty, and the appearance of the building should improve with age. Twenty years ago architectural beauty was neglected in many of the plants, but there is at present a strong tendency to make up for this neglect. This is strikingly illustrated by the beautiful filtration plant structures just completed at Cleveland.

A group of six small brick dwellings, matching the architecture of the main group, will be built near the filtration plant for the use of the employees.

The studies, plans, and construction of the new filtration plant, aqueduct and other water-supply structures are under the office of the Chief of Engineers of the War Department. Work on the project was begun by Major M. C. Tyler, Corps of Engineers, who continued in charge until 1923, when he was transferred to Muscle Shoals. His place was taken by Major J. A. O'Connor, Corps of Engineers, who is now in charge of the work. E. D. Hardy, Associate Engineer, is in direct charge of designs and construction. J. E. Curtis is Superintendent of Construction of the entire project, and the writer is in charge of the drafting room and is also in direct charge of the construction of the filtration plant under Mr. Curtis. The contractor is the Chas. H. Tompkins Co., of Washington, D. C. J. W. Armstrong, Filtration Engineer for the city of Baltimore, is consulting engineer on the work.

ACKNOWLEDGMENT.—From a paper read before the American Water Works Association, at Buffalo, 1926.


WE ARE AS CROWDED AS THE OLD WOMAN IN THE SHOE
GOOD SCHOOLS MAKE GOOD CITIZENS
VOTE YES
BE WISE
VOTE FOR SCHOOL BONDS
VOTE YES FOR SCHOOL BONDS
PLEASE VOTE YES FOR SCHOOL BONDS
SOME DOG HOUSES EXCEL OUR SCHOOL HOUSES
VOTE YES FOR SCHOOL BONDS
PUT IT OVER
SCHOOL BONDS

POSTERS BY SCHOOL CHILDREN IN THE JOHNSTOWN BOND ISSUE CAMPAIGN

Methods of Securing Support for School Bond Issues

By W. S. Deffenbaugh

Chief, City Schools Division, Bureau of Education, United States Department of the Interior

THIS outline has been prepared to answer requests made by city school superintendents and others as to effective methods of informing the public regarding school-building needs and the necessity of a school bond issue; also as to the methods of arousing an interest among the voters in the proposed bond issue. School officials recognize the fact that the mere announcement that an election will be held on a certain date to vote on bonds of a specified amount for new school buildings is in most instances not enough publicity. Before voting for bonds, the people want to know why new buildings are needed, how much their taxes will be increased, where the new buildings are to be located, etc. To get all the facts on these matters before the public and to present them in such a way as to arouse the interest of the voters requires a campaign of advertising.

There are numerous methods used to present the facts and to arouse interest. A very effective way of conducting a school bond campaign is to prepare folders containing questions and answers regarding the school-building needs, for distribution among the voters, and to run the same questions and answers in the local newspapers. Quarter- and full-page paid advertisements in the newspapers of the city, setting forth in striking fashion the school-building needs of the city, is another effective method. Among other forms of advertising that

have been found helpful are handbills, posters, radio talks, four-minute speeches in local theaters, addresses before various civic organizations, and pictures of school-building conditions and of crowded classrooms shown in moving-picture houses.

Some Typical Questions

The following are the questions that may be found in school bond campaign material that the Bureau of Education has received from boards of education in different sections of the country:

1. How many regular and special classrooms should have been added each year for the past ten years to meet the shortage and care for the annual increase of pupils in grades and in the high school?

2. How many regular and special classrooms have been added during the ten years?

3. How many children are on part time? How many are housed in buildings that should be abandoned? How many are housed in temporary buildings and how many in basement rooms not at all suitable for classrooms?

4. Why has not this city provided enough school buildings?

5. How rapidly is the population of the city increasing?

6. What is the actual net gain in pupils per year in the entire school system? In the elementary school grades? In the high school?

7. Does the increased enrollment in the high school show that high school advantages are more widely demanded?

8. What is the relation between the growth of the school population and the increase in high school enrollment?

9. What is needed to remedy the overcrowded condition in the high school? In the elementary schools?

10. Will the proposed buildings provide for growth or will they simply take care of the present enrollment?

11. Cannot additions to the present school buildings be erected at less cost than new buildings?

12. Why should we erect junior high school buildings and not elementary nor high school buildings?

13. Where are the new buildings to be located and why so located?

14. Would it not be possible to pay for the school buildings without a bond issue?

15. How much will the proposed bond issue increase the tax rate of the school district?

16. How does the school tax rate based on assessed and on estimated real wealth compare with that of other cities of the same class?

17. How does the per capita wealth of the city compare with that of other cities?

18. How does the annual expenditure per pupil in average daily attendance compare with that of other cities?

19. How does the per capita bonded indebtedness for school purposes compare with that of other cities?

20. How much real wealth is back of each dollar expended annually for school purposes? How does this compare with the wealth back of each dollar expended on schools in other cities?

21. Do you know that it has required $ during the past five years to keep the old buildings in repair?

22. If new buildings are not erected now, how will the efficiency of the schools be affected?

Methods Used in Successful Campaigns

The following examples of successful school bond campaigns and the plans for conducting them may be mentioned:

JOHNSTOWN, PA.—Here a bond issue of $1,250,000 was recently voted. The campaign was organized in a school committee with James Killius, Director of Vocational Education, in charge of publicity, who has furnished the Bureau of Education the following summary of the activities of the campaign:

1. A mass meeting of all teachers.

2. Organization of citizen committees of 300 by wards and districts.

3. Preparation of a daily memorandum to an 800-mailing list outlining systematically the arguments for the bond issue.

10 REASONS WHY

THE VOTERS OF THE CITY OF JOHNSTOWN

SHOULD VOTE "YES"

FOR THE SCHOOL BOND ISSUE NOVEMBER 3.

1. BECAUSE the success of the Schools of Johnstown is based upon THE COMPLETION OF THE SCHOOL BUILDING PROGRAM.
2. BECAUSE the Citizens in the Morrellville District deserve a square deal. Their new Junior High School must be built.
3. BECAUSE one out of every ten children in the Johnstown Public Schools attend school in basements, portables, store rooms or once abandoned schools.
4. BECAUSE Woodvale School in the Eleventh Ward must be replaced by a new Grade School. There is no other possible solution.
5. BECAUSE the COMPLETION OF THE SCHOOL BUILDING PROGRAM insures adequate school facilities for years to come.
6. BECAUSE Equal Educational Opportunities should be afforded ALL the children in all parts of Johnstown.
7. BECAUSE this Bond Issue will provide for permanent improvements without delay and will prevent waste of money on further make-shift accommodations.
8. BECAUSE the proposed Bond Issue will not impose undue burdens upon the present taxpayer but will be spread out over a number of years.
9. BECAUSE the Bond method of getting permanent improvements is used everywhere and assures that the people who use the improvements help pay for them.
10. BECAUSE the progress of public education and the progress of democracy are inseparable.

LITTLE CHILDREN HAVE NO VOTES

Think of them as you consider this proposition

HANDBILL USED IN JOHNSTOWN CAMPAIGN

4. Organized bond issue songs.
5. Slogans, rhymes, etc., with contests in the schools.
6. Carefully prepared daily paid newspaper advertising from one-eighth to one-fourth page in two opposing papers.
7. Inserted "Vote 'yes' for school bonds November 2" in four or five places in the local columns of both daily papers.
8. Elimination contests in schools for best four-minute speeches (boys and girls) on the school bond issue.
9. Slides shown between pictures in all "movies" each evening, "Vote for school bonds."
10. Community meetings, music and entertainments by the schools, addresses by the board of education and leading citizens.
11. Prepared newspaper publicity for every community meeting.
12. Pictures and feature articles descriptive of all undesirable school situations.
13. Four-minute speeches between shows in the theaters and "movies."
14. Display float, "There was an old woman who lived in a shoe," for Hallowe'en celebration.
15. Monster parades of school children just before election day.
16. Billboard poster advertising.
17. Automobile banners.
18. Handbills and dodgers several times during the campaign, sent home by the children.
19. Special bond issue number of the grade school, evening school, and junior high school papers.
20. Speeches in the churches by the school children Sunday prior to election day.
21. Lapel tags, "Vote 'yes' for school bonds."
22. Workers hand cards.
23. Personal workers at the polls.

DAYTON, OHIO.—The following is a general outline of Dayton's school bond campaign, where a $4,000,000 bond issue was voted. An intensive campaign lasting three weeks was conducted. Extensive use was made of the newspapers both in the news and the advertising columns. In addition, a corps of thirty speakers was organized who addressed all parent-teachers associations, noontide clubs, factory and shop meetings. Twenty-two talks were given over the radio at meetings scheduled and broadcast from the Parker High School. A film showing the actual conditions existing in the Dayton schools was shown at the leading moving picture theaters and at meetings where some of the speakers appeared.

LONG BEACH, CALIF.—This successful school bond campaign resulted in a 20 to 1 vote for a large bond issue. The plan of the campaign, as described by the Superintendent of Schools, was as follows:

"We have three daily papers, all of which gave enthusiastic support to the campaign. Not a single letter communication, or editorial of any kind or description during the two months the campaign was on was published that had in it the least suggestion of criticism of the campaign. All of the papers gave without limitation of their space to pictures, cartoons, news items, and editorials.

"About 80 per cent of all the eggs sent out from our jobbing houses to the retail trade were stamped with the words 'School bonds, vote yes January 15th.' The high school girls stamped 108,000 eggs that went into almost every home in the city.

"The radio station of the *Los Angeles Times* broadcast bond speeches for us that were heard all the way from New York to the Philippines.

"Automobile stickers with the words 'School bonds, vote yes January 15th', were used by the thousands.

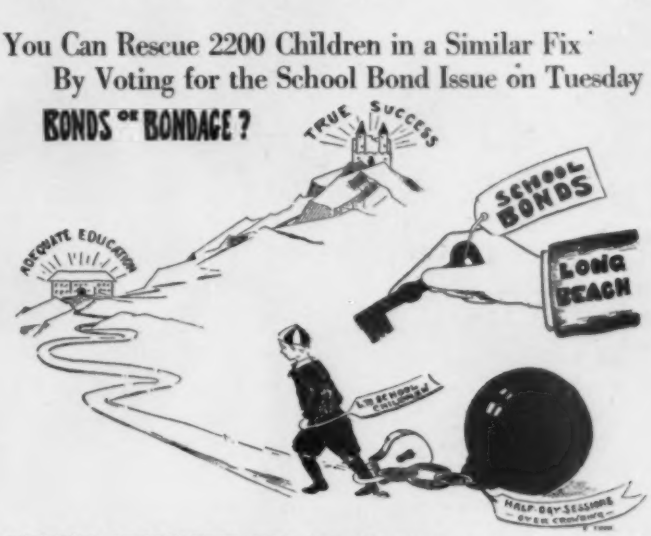
"Earl Dougherty, one of our aviators, on election day flew over the city, scattering thousands and thousands of dodgers.

"The Foster & Kleisner Sign Board Company donated for our use ten of their largest signboards located in the most conspicuous places in the city.

"On election day one of our motor vehicle companies donated one of their largest busses for our high school band, which traversed the various streets of our city.

"Practically every organization of any kind or description in the city gave time on the program for one of our speakers.

"In all of the voting precincts the children put on parades of various kinds and descriptions. On election day continuous entertainment was afforded the patrons of the school in the various school buildings which were the precinct polling places. We succeeded in getting out the largest vote that we have ever had on a school bond campaign.


You Can Rescue 2200 Children in a Similar Fix
By Voting for the School Bond Issue on Tuesday
BONDS OR BONDAGE?
TRUE SUCCESS
SCHOOL BONDS
LONG BEACH
ADEQUATE EDUCATION
HELP GET SCHOOL OVER CROWDING

CARTOON ADVOCATING THE SCHOOL BOND ISSUE PUBLISHED IN THE LONG BEACH "TELEGRAM"

Vote "YES" on the Two Mill Levy and "FOR" on the School Bond Issue, and assure every child the privilege of being taught by a happy, well-trained, competent teacher, in a safe, well-lighted, well-ventilated, sanitary school room.
The Two Mill Levy Will—
The School Bond Issue Will—
A Vote for the Two School Measures
Is An Investment in Citizenship

A DOUBLE-PAGE SPREAD IN "SCHOOL PROGRESS," THE OFFICIAL BULLETIN OF THE DAYTON PUBLIC SCHOOLS

"The parent-teachers organizations made a house-to-house canvass with the official statements of the Board of Education, and answered questions that the voters desired to ask.

"The offer of automobiles on election day was so universal that there were hundreds of machines available that we found it impossible to use.

"On the morning of election day every child placed under the plate of his father and mother a little note which he had written in school to the effect that this was election day and father and mother should remember to vote."

Bibliography

The following are some of the publications on school publicity that should be helpful to those who are planning a school bond campaign:

Alexander Carter. School Statistics and Publicity. Silver, Burdett and Co., Boston, 1919.

Contains chapters telling how to present tabulated statistics to the public, how to present school statistics graphically for the public, and how to translate statistical material on schools for the public.

Alexander Carter *and* Thiesen, W. W. Publicity campaigns for better school support. World Book Company. Yonkers-on-Hudson, New York, 1921.

Contains chapters telling how to select arguments and illustrations, and how to prepare and circulate material for effective publicity, and a chapter giving examples of good publicity material used in successful campaigns for better school support.

Fowlkes, John Guy. School Bonds. The Bruce Publishing Company, Milwaukee, Wisconsin, 1924.

The chapter "Justifying a School Bond Issue" contains many good suggestions for a publicity campaign. Among other helpful chapters are: How Can School Building Programs be Financed?; What Is a School Bond?; Trends in School Bonded Debt.

Selling the School Bond Issue to the Community. Better Schools League, 53 West Jackson Boulevard, Chicago, Illinois. 1925.

Contains fourteen advertisements used in a school bond campaign, McKeesport, Pa.

What Every Child Should Learn

The commission appointed by the National Education Association for the revision of secondary education has said that everyone should learn (1) how to keep well; (2) how to use the fundamental processes; (3) how to make a good home and rear his children; (4) how to work efficiently and happily; (5) how to be a faithful citizen; (6) how to spend his leisure wisely and (7) how to regulate his life according to the standards of right living.

These definite categories involve masses of knowledge, habits, skills, ideals, attitudes, and appreciations that can be taught in the school and the home. They recognize frankly that the school is but one of many agencies through which the social inheritance passes on to the new generation. Taken as a whole, they furnish a basis for deciding what shall go into the curriculum.—*Journal of the National Education Association.*

Investigating Inadequate Sewers---II

By Alden Wells

Assistant Engineer, Department of Engineering, Hartford, Conn.

Gaging Storm Flow

THE simplest method of estimating the storm flow is by direct inspection of conditions during the storm. But as the period of maximum flow is very short and cannot be determined till it has passed, direct observations during the storm do not give complete information. Inspection of manholes during or immediately after a severe storm may give some information respecting conditions at that particular point which might not be learned otherwise. But such inspections are not equivalent to gagings by other methods.

We have used several types of gage intended only to register the maximum height of water. The most satisfactory gages have consisted of a staff having small bottles attached to it at intervals of 4 or 6 inches, set in a manhole. The tops of these bottles are protected so that water will enter them only when they are submerged. After the storm is over, the staff is lifted out of the manhole and the highest bottle containing water noted. Such gages are set at intervals along a sewer and the readings from them are plotted on a profile of the sewer. These bottle gages are also useful to check or to amplify the record obtained by recording gages.

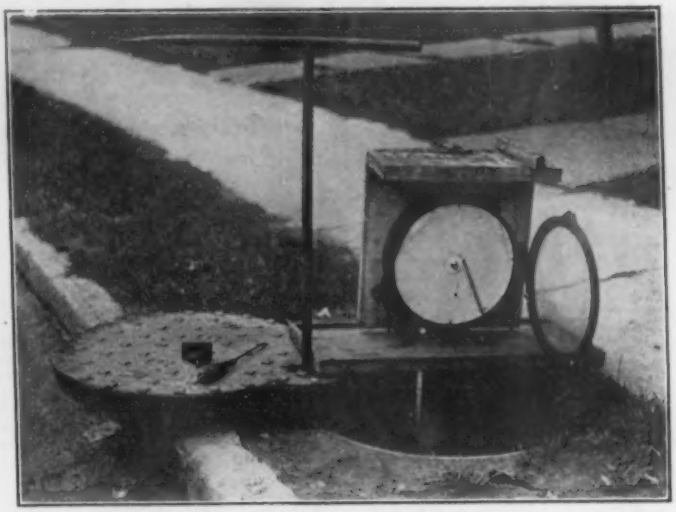


FIGURE 3A.—RECORDING-GAGE IN SEWER MANHOLE, SHOWING THE RECORDER LIFTED UP OUT OF THE TOP OF THE MANHOLE READY FOR WINDING AND CHANGING THE CHART

Recording Gages Helpful

The most complete records of storm flows in sewers are obtained by recording gages of the air-pressure type. For investigating sewer complaints, we place these in standard manholes without any special construction to accommodate the gage. The bulb and its air tube are mounted on a wooden staff which is long enough to reach from just under the manhole cover down to the depth where the gage is to be set. This staff has a sort of bayonet on its back near the top and another at the bottom, to secure the staff to the iron steps regularly built in manholes. In some cases provision must be made lest the staff be lifted by the water around its lower end. If used on a large sewer, an iron bar bent to fit the curved side of the invert may be fastened to the end of the staff to hold the bulb lower than the staff can reach. The recorder is mounted on a board which rests on or is hung from the top step. This mount, carrying the recorder, can be lifted up out of the manhole when it is necessary to wind the clock, change the chart, or otherwise tend the gage. A little slack is left in the air tube to permit of this movement. Fig. 3A shows a recorder lifted up out of a manhole ready for attention. For studying storm flows we use recorders turning their charts once every 24 hours and clocks which will run a week on one winding. Two gages of the type shown in Figs. 3A and 3B have been in use at various times for 8 years, investigating sewers. A third gage of different size and manufacture, though of similar type, has recently been added to our equipment. We have obtained some interesting records, but have also encountered some difficulties with leaks in the air-tube connections and clock troubles. Fig. 4 shows a record obtained from such a gage worked up ready to show with a report. This was obtained by tracing the curve of the record together with just enough lines to indicate the scale of the chart. It is much clearer to the layman than would have been the original chart from the recorder. In addition, there

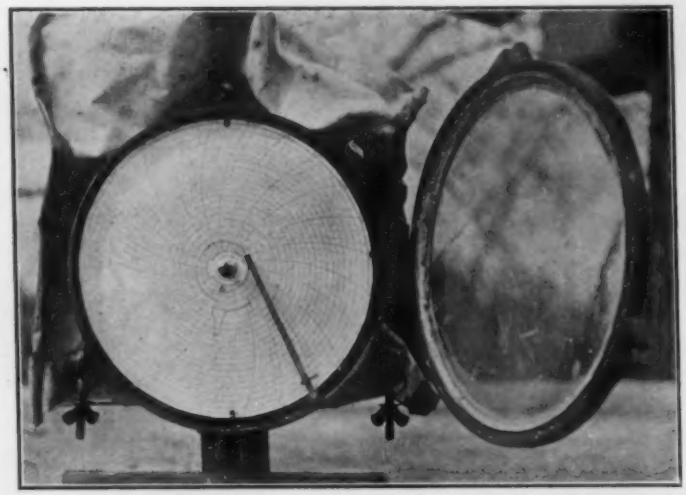


FIGURE 3B.—RECORDER LIFTED UP OUT OF SEWER MANHOLE
The pliable air tube connecting the recorder to the bulb at the bottom of the manhole can be distinguished in front of the support at the bottom of the picture. A hook on the back of a wooden frame in back of the recorder is hung on the top step in the manhole to hold the recorder when the manhole cover is on. The cloth seen at the top of the recorder is used to cover it when lowered into place, to protect the gage from drippings from the manhole top

has been plotted around the margin an additional curve obtained by transcribing the record of an automatic rain gage which was only about a quarter-mile from the manhole where the sewer record was obtained. The curve showing the rate of rainfall over five-minute intervals clearly indicates the close relation in point of time between rain squalls and variations of flow in the sewer. This particular chart also showed the effect of the flood in the small river into which the overflow from this sewer discharged. The record shown in Fig. 4 does not indicate any overload in the sewer at that point. We have used these recording gages in a considerable number of locations and with them have obtained interesting data respecting several sewers.

Occasionally gage readings may be of value to demonstrate that a certain sewer does not become overloaded, and that any trouble which may occur is due to other causes.

Value of Inspection of Damaged Premises

Another factor which must be considered when studying an existing sewer is the amount of damage which its inadequacy causes. If the problem has been started by a complaint or complaints from injured property owners, one of the first steps is to secure from the owners detailed information as to the nature of their difficulties. This generally involves an interview and an inspection of the premises where flooding has occurred. Inspecting flooded cellars and listening to other peoples' troubles is generally not very interesting work, but there are occasional exceptions, such as the following:

A couple of years ago, when the interior of a building was being redecorated, the painters used a basement room for storing and mixing their paints. On the floor of this room they left thirty-odd pails and pots of varied colors. A violent thunderstorm flooded the cellar. Those paint pots floated and were presently bobbing about like multicolored corks, until, one by one they chanced to tip over—mixing paint and dirty water—and then sank.

Sometimes there is near tragedy in a flooded cellar. The same storm as in the paint-pot episode just mentioned above destroyed most of the stock and damaged some of the fixtures in a small store run by a cripple. This store was located in a basement room into which water poured through the doorway, filling the room to a depth of four feet.

When inspecting premises which have been flooded by water said to have backed up from the sewer, one should keep his eyes open. Sometimes the sewer is not to blame. Early in his experience the writer was sent to look over a small factory which had given notice of a damage claim. Stock stored in the basement had been wet during a storm on a Saturday

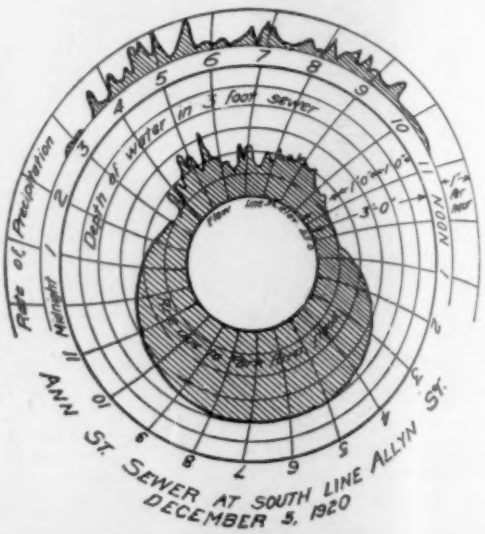


FIGURE 4.—CHART FROM AUTOMATIC RECORDING GAGE IN SEWER MANHOLE
This chart was traced from the original and the rate of precipitation added

afternoon when the shop was not running. No one—not even a watchman—had actually seen the water enter the basement. But the manager was quite sure that it had backed out of the sewer. There had been a violent storm on Saturday afternoon and the catch-basins in front had failed to take the water away as fast as it fell. The manager had witnesses who had seen the street flooded from gutter to gutter. The manager honestly believed that his loss could be traced to the sewer. Two former tenants had collected damages on similar protected windows set below grade. The office photographer and a level party were sent to make sure of the facts, and that finished the manager's claim.

On another occasion a basement was carpeted with mud varying from nothing at one end to six inches deep at another point. Tracing this to the deepest point, we found a hole in the foundation wall where a service pipe had been removed, and outside, opposite the hole, was a fresh excavation where work was going on. A holiday storm had filled that ex-

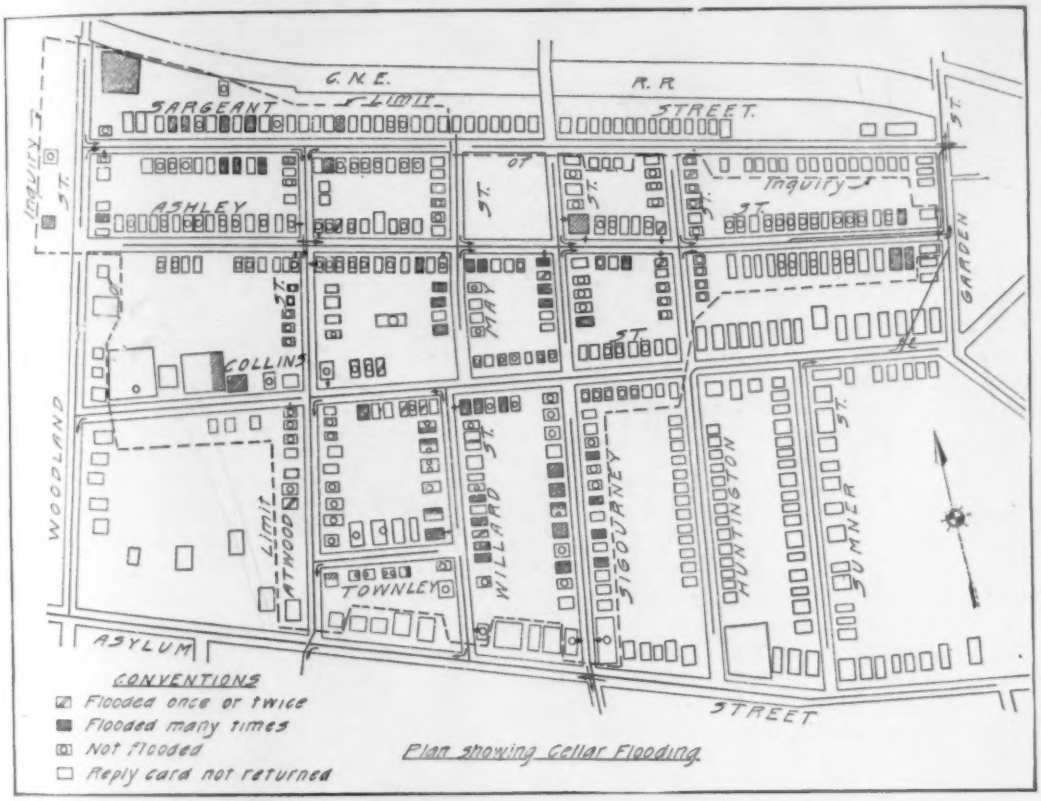


FIGURE 5.—CHART SHOWING RESULT OF POST-CARD CANVASS OF SEWERAGE DISTRICT

claims. The writer looked the place over pretty carefully, inside and out. Then he reported to his office that during a hard rain accompanied by high winds such as at the time in question, considerable water from roofs might accumulate in the yard in back of this plant; that water in the yard was quite as likely to flow into the basement through an unguarded doorway as it was to flow away through the yard drain; that the grating over the yard drain was so small that a small bit of paper or other rubbish could entirely cover it up and put the drain out of action, and that water running down a gangway at the side of the building could enter the basement through excavation with water, which, becoming charged with mud, had flowed through the hole in the foundation wall.

Even though in many cases little of technical value is learned from inspecting flooded premises, such visits have value as an evidence of the interest of the city's officials in the complaints of an individual property owner. This feature should not be lost sight of in planning any investigation of flooding complaints.

Personal Calls or Inquiries by Mail?

Personal calls can be made when the trouble is confined to only a few pieces of property. It is different when one has to estimate the in-

convenience caused over a large area by inadequate sewers. We have made house-to-house canvasses over whole city blocks or more, but unless considerable time and care is given to each call the results are not wholly satisfactory. If there has been a definite complaint from a given building, then one has a starting point for his interview; he has some definite person to seek and talk with; and there is a particular incident to be discussed. But to ring a door-bell whence there has come no complaint and then to ask whoever happens to answer the door if they have had any trouble from sewer-flooding, is a gamble. He or she gives the investigator a snap answer, without thought or consulting others in the house, on a matter about which he or she may or may not know very much. In cases where the number of buildings to be investigated is small, or the canvass is important enough to search out carefully the proper person at each place and explain the problem carefully to him, a personal canvass may be very useful and valuable. In general, for questioning large areas a written canvass by mail is preferable. Your inquiry is more likely to be answered by the proper person at each address and he will stop and think before answering. Furthermore, the replies, if made on a form supplied by the engineer, can be standardized.

We have used government reply post-cards for canvassing districts. On the original card is a simple statement as to what information is desired. On the reply card are spaces for the street, number, name of the owner of the property concerned, and two questions—"Have you had any difficulty due to failure of the sewer in front of the above property to work properly during hard storms?" and "If so, please state details, when, how many times and what." At the bottom is a line for signature. We fill out the description of the property, including the owner's name, before the cards are sent out. In the case of corner lots having sewers on two sides, whose drainage is not known to us, we insert an additional inquiry as to which sewer serves them. Fig. 5 shows the results of such a post-card canvass plotted ready to be shown to the Board as part of the engineer's report. In this particular case only about two-thirds of the replies came back. No effort was made to follow up the missing returns. The cards were sent to the owners in all cases. If a building was jointly owned by several persons a card was sent only to one owner. More complete and accurate returns would probably have been secured if more cards had been sent in certain cases. If the owner is not located at the address in question, it would be well to send cards to both owner and tenant. If an owner has but recently acquired a piece of property it might be well also to send an inquiry to a former owner or tenant. After a reasonable time has elapsed, all missing replies can be followed up, either by second cards or otherwise. The results of a canvass made in this way are probably more accurate than a haphazard house-to-house personal canvass. A post-card canvass is certainly less work. In the particular district shown in Fig. 5 levels of house cellars were taken and plotted on profiles, seeking thus an explanation of why certain houses were flooded when the premises belonging to their immediate neighbors were not.

Conclusion

It is not within the scope of this article to discuss what form relief measures should take. That depends on the particular problem. Relief may mean extensive construction; it may simply mean improvements in some poor detail; or perhaps the inconvenience caused is so slight as not to warrant the expenditure for proper relief works.

The writer wishes to make it plain that just because a sewer is now inadequate for present needs, it does not follow that it was improperly designed or built, considering what the conditions were at the time when it was constructed.

The reader should not get the impression from what has been written that the sewers of Hartford are either grossly inadequate or troublesome. The sewer system of that city will bear comparison with combined systems elsewhere. It is simply one of the consequences of progress that things become outgrown and must be altered or replaced. To determine just when a sewer has outlived its usefulness and should be brought up to date involves more than mere calculations of drainage areas and capacities. The writer has outlined some of the steps taken and methods used in studying such problems. Several illustrations have been given showing how the results of these investigations can be arranged for presentation to city boards and to the public. Some emphasis has been given to this last feature. It is the hope of the writer that some reader will find in these illustrations some suggestion of use to him and that the reader can perhaps, in turn, offer some new idea to those whose experiences have just been set forth.

The Criteria of Good City Government

By William Bennett Munro

Professor of Municipal Government in Harvard University

WE know that a railroad is being efficiently managed if the fares and freight rates are low, the service good, and the profits high. No railroad, if inefficiently conducted, could satisfy these three tests. We know that a bank is being efficiently managed if it keeps drawing business away from its competitors and increasing the annual dividend to its own stockholders. But the city—by what tests can the goodness or badness of its government be appraised? Not by the growth of its population, or by the size of its tax rate, or by the amount of its funded debt. Nor yet by the splendor of its public buildings, the cleanness of its streets, or the integrity of its police. All these things are of some significance, but they reach only a little way. German cities, before the war, kept their streets spotless and their policemen honest — but they were sadly deficient in municipal democracy and grossly neglected some of the social welfare branches of community administration. A city with well-paved streets and no housing laws is not a well-governed city. A city with honest policemen and no public playgrounds is in the same category. To judge a city government fairly, we must apply a rather long series of criteria extending over the entire field of municipal activities—legal, political, social and economic. To use a metaphor of the open road, one might say that a city administration is not functioning well unless it hits fairly on all four cylinders. The legal powers of the municipality may be adequate; it may have a generous measure of home rule, and yet be unable to keep its politics clean. It may have honest men in public office and yet be unprogressive in its administrative methods. Honesty and efficiency do not always go together. By what tests can a city be fairly judged?

Government as It Appears to the Average Citizen

It is not always easy to tell whether a city government is good or bad. No city is ever as well governed as it ought to be; on the other hand, no city is ever so badly governed as its critics would have us believe.

People judge the quality of a city's government in accordance with their own prejudices or partialities, for the reason that they have no objective tests to apply. In the old days, when the government of the community was a relatively simple affair, the average citizen knew his rulers and could keep an eye on what they were doing. He knew whether his taxes were going up or down, whether the streets were kept clean and the laws obeyed. But now, in the larger centers, all this has got far beyond him. Two-thirds of the citizens know nothing about the tax rate. They are not property owners, and although they pay taxes indirectly (through landlords and merchants), most of them do not realize the fact. And as for the efficiency of the various city departments—such as police, fire protection, public works, schools, and all the rest—the average citizen can see but a small part of the work and even as respects this small fraction he is hardly competent to form an opinion of his own. How can he tell, for example, whether the city has the form of charter most suited to its needs, whether the departments are properly organized, whether there are too many drones on the municipal payroll, whether the budget system is functioning smoothly, or whether the per capita cost of his city's government is higher than it ought to be? Even well-educated and well-informed citizens are frequently unable to make up their own minds on such matters.

What we need, accordingly, is a series of nonpartisan tests or criteria by which the efficiency of a city government can be fairly measured. The accompanying article, which suggests twenty-five such tests, comprises Chapter XXIII of the new (1926) edition of the author's book on "The Government of American Cities." This chapter is here reprinted by special permission of The Macmillan Company, of New York, owners of the copyright.

Rigid Formulas Unfair

Now there are obvious dangers in laying down any series of formulas where so broad a range of functions is concerned and where the conditions are so widely variant. All cities are not easy to govern. In some of them, by reason of their physical or social structure, the problem is more difficult than in others. That being the case, the use of a rigid yardstick in measuring the efficiency of government, in all cities of whatever size or character, would be clearly unfair. The criteria, if used at all, must not be too definite and they should be somewhat flexibly applied. With this reservation, they may serve a useful purpose. They will at least direct attention to the vital things in community administration.

A Suggested Series of Twenty-five Tests

There will be differences of opinion, quite naturally, as to these objective tests of good

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city government. No one, however intensively he may have studied the operations of American municipalities, is qualified to lay down a definitive series of rules to which they should conform. The best that can be done is to indicate certain general questions which the intelligent citizen may ask and answer in relation to his own local government. And if he can honestly answer all of them in the affirmative, he may rest assured that the mechanism is sound in its essentials. If the government of his city, under such conditions, is not what he desires it to be, the only counsel to be given him is one of hope and patience. The following questions, therefore, are suggested as an aid to the citizen's survey of his own government.

1. How Much Genuine Home Rule?

Do the constitution and laws of the state afford the city a reasonable amount of freedom in the management of its own affairs? A reasonable amount of municipal freedom does not necessarily involve home rule, as this term is commonly understood. It does not require that the city shall have the right to frame and adopt its own charter. Municipal home rule, as has been pointed out in a previous chapter, may mean much or little. In some states it is hardly more than a pleasing phrase. A city may be given the right to make its own charter and still be hedged by so many restrictions that this right amounts to very little. In determining the degree of freedom from state interference which a city enjoys, one should regard the traditions and the facts, not merely the letter of the constitution and the laws.

2. The City Charter

Is the city charter a document sufficiently concise and intelligent to be within the comprehension of those who have to do their work under its provisions? In other words, does it confine itself to fundamentals or is it cluttered with details and minor provisions of all sorts? Is it really a charter or does it attempt to usurp the ordinance-making authority of the municipality? Is it a constructive document which aims to facilitate the work of honest and capable officers, or are its provisions for the most part checks and balances, framed on the assumption that the people will elect incompetents, and designed to forestall the inevitable results of popular folly,—in other words, to protect the people against themselves? Are the provisions of the charter worded in such language that he who runs may read and understand?

3. The Frame of Government

Is the structure of city government simple, does it provide for a sufficient concentration of responsibility and at the same time ensure responsiveness to the will of the people? These qualities are not peculiar to any one form of government. The mayor-and-council type of government can be made as simple as any other. The city manager plan, although often criticized for its lack of responsiveness, is not intrinsically deficient in that respect. The commission plan of government does not readily lend itself to a full concentration of responsibility, yet many cities have achieved it under this plan. In a word, the type of government is not the sole consideration. The real question is: Does the structure of city government, whatever its type, combine the qualities of simplicity, concentration, and responsiveness to a sufficient degree?

4. Popular Control

Is there adequate provision for the control of the government by the people? Many cities have endeavored to make such provision by means of the initiative, referendum, and recall. These agencies of control have merit, as has been shown, but they do not by any means provide an absolute insurance against official irresponsibility. Nor, on the other hand, can popular control of the government be stigmatized as inadequate because a city has made no provision for initiative petitions, referenda, or the recall of elective officers. There are reformers who do not hesitate to brand a city charter as a poor affair whenever they find no provision for these things in it, but they would find difficulty in pointing out any American city that has attained good government through the mere possession of these instrumentalities or has lost it through the lack of them. Adequate popular control can be secured in a variety of ways, some of which will be suggested in the next few paragraphs.

5. How Many Elective Officials?

Are the elective positions few and outstanding? The method of electing officials by popular vote should be used to fill only those positions which carry policy-determining functions, which are conspicuous, and on which the public attention can be focussed. This ensures a short and wieldy ballot. When you ask the voter to choose a dozen or more officials at the same election you are taking one of the best ways of making his government irresponsible. The short ballot is the best of all agencies for promoting discrimination on the voter's part and hence insuring the responsiveness of his government to him. Some would add that the ballot, besides being very short, should contain no party designations, but that is a

matter on which there may be legitimate differences of opinion. Long and cumbrous ballots are in any case to be avoided, which can only be done by reducing the number of elective officers.

6. Concentration of Administrative Responsibility

Are all the regular administrative officials of the city directly chosen by and responsible to the chief executive authority? Officials whose duties are not concerned with the determination of policy but are of a purely administrative character should be appointed. The chief executive officer of the city, be he mayor or city manager, should have undivided power of appointment and removal, without the confirmation or concurrence of any other authority and subject only to the civil service regulations. Unless this is done, there can be no centralization of administrative authority. Make a chart showing the way in which the administrative service is organized. Do all the lines converge inward and upward? If not, the scheme of organization is prima facie defective.

7. The Terms of Office

Are the terms of office long enough to give elective office-holders an opportunity to demonstrate what they can do, and are they short enough to hold these officials to a strict accountability? In general, the terms of office for mayors and councilmen have been too short. They should in no case be less than two years. Four years is in most cases a better term, but longer terms than this would probably be unwise. Even with four-year terms there is something to be said for having the recall procedure available in case of need.

8. Size of the City Council

Is the legislative organ of the city large enough to be representative, yet small enough to function smoothly? Large city councils waste time in futile discussion. Not being able to get business done in the council chamber, they refer it to committees. These committees do much of their work in executive session, behind closed doors, with no publicity given to the motives which influence their recommendations. They are subjected to various forms of pressure which would not be exerted in the open. It is desirable that the city's organ of law-making and policy-determining should be small enough to avoid the necessity of relegating important matters to any subordinate body. In English cities the committee system works satisfactorily because a good tradition has long since become established. In America the people are suspicious of council committees, and with good reason, for they have not contributed much to the efficiency of government in municipalities. A city council of seven, nine, or eleven members can get along without delegating much of its work, but a council of twenty or thirty members cannot. Care should be taken, however, to avoid the other horn of the dilemma, which is the fault of making the council small to the point of inadequate representation. There is no virtue in cutting the council to a membership of five or seven if this means that various important elements in the population of the city must go unrepresented altogether.

9. Plan of Departmental Organization

Does the city's departmental organization conform to sound administrative practice? More specifically, is the number of departments no greater than the work requires? Does each department possess functions which are well worked out and related in character —or is there too much machinery, with the resultant duplication and friction? There is no ideal number of administrative departments and no model plan for organizing them. But there are certain principles which a sound departmental organization ought to follow.

10. Merit System

Are the subordinate officials and the employees of the municipality appointed and promoted on a merit basis and are they adequately protected against removal without cause? There are only two methods of selecting and advancing public employees, namely, the spoils system and the merit system. The latter has its shortcomings, no doubt, but it is steadily being improved and the improvement inevitably will continue. The objections to the spoils system are fundamental and inherent; they cannot be eradicated by any change in administrative methods. In the case of the merit system, on the other hand, it is merely a matter of overcoming various practical difficulties, perfecting the mechanism, and making it function more flexibly.

11. Morale of the Working Force

Are the city employees paid fair wages according to an equitable classification of work? A great deal of injustice is embodied in the payrolls of most American cities. Some employees are paid too much; others too little. Different salaries are often fixed for work of precisely the same character. The favored employees get the soft berths and this is disastrous to the morale of the whole working force. Everybody resents favoritism except those who

are the recipients of it, and they inevitably form a small fraction of the whole. Is there a standard classification of work and wages with a direct connection between the two?

12. Pension System

Is there a system of pensions for disabled or superannuated municipal employees, resting on a sound actuarial basis? It is an axiom of practical politics that a city must take care of its employees when they become disabled in the service or too old for further duty. If there is no pension system they will be kept on the payroll and given full wages for nominal work. This is a highly expensive method of meeting a moral obligation and in the long run is far more costly than an out-and-out pension plan. It is not only more expensive but much less satisfactory to all concerned.

13. Contracts

Are all important contracts awarded by fair competition, openly advertised, without regard to any considerations other than the city's best interest? It is not enough that the city charter shall contain general stipulations providing for the advertisement of contracts and for competitive awards. There are various ways of evading such general stipulations. The real question is whether the awards are fair in fact or whether there is a mere gesture of compliance with the law accompanied by subterfuge or trickery. Unfairness in the award of municipal contracts cannot be completely eliminated by any form of statutory prohibition. It is a matter of good traditions and official honesty.

14. Inspection of Public Works

Is there a system which ensures the rigid inspection of all contract work being done for the city, and is this inspection performed without fear, favor, or affection? It avails little to draft specifications carefully and to award contracts honestly if there is no effective follow-up to ensure that the terms of the contracts are observed. There has been more waste in cities through lax or dishonest inspection than through the award of contracts by favoritism, although both things usually go together. The award gets public attention while the work of inspection does not. For that reason the latter needs to be particularly emphasized.

15. Budget Procedure

Are the appropriations made in accordance with a sound system of budgetary procedure? This involves the use of proper forms for the submission of estimates, a reasonable amount of segregation among the items of expenditure, a workable plan for the scrutiny of the estimates by qualified examiners, and a series of public hearings before the budget is adopted. In general, it is desirable that the responsibility for having the budget prepared for submission to the legislative body shall be entrusted to the chief executive of the city. But it is also important that no item of appropriation shall become effective until it has received the legislative body's approval. Apart from these general considerations, there are many subsidiary tests of a good budgetary procedure. What arrangements are made for providing the departments with funds pending the adoption of the budget? How are transfers made from one appropriation to another during the course of the fiscal year? What means are employed to prevent the head of a department from exhausting his appropriations before the year is out? Does the budget make adequate provision for unforeseen and emergency expenditures? In a word, is the procedure such that it functions smoothly and promotes economy, or does it lead the city officials into financial snarls and produce deficits with ominous frequency?

16. Are Revenues Adequate?

Are the city's revenues adequate for the work which its people expect their municipal government to perform? There are various devices for keeping the cost of city government within bounds, but one of the least effective is the plan of providing in the city charter that the tax rate shall not be fixed above a certain point —say ten dollars per thousand of assessed valuation. When the people demand more service, or better service, and when they elect officials to provide it, these officers will find the revenue, no matter what the charter may provide. They will jack up the assessed valuations, or borrow money to pay current expenses, or merely let a deficit accumulate. No statutory device will avail to keep the people of a city from having what they want. There is only one way to accomplish it—which is by taking the suffrage away from them. That being an unpractical step, the alternative is to let them bear the brunt of their own extravagance and learn by experience that good things cannot be had without sacrifice. To manage a city's affairs agreeably to the demands of the citizens is a task which, however economically performed, requires a steadily increasing amount of annual revenue, most of which must come from taxes. There should be reasonable leeway in obtaining the funds needed.

17. Borrowing Policy

Does the city pursue a sound policy in the matter of borrowing? Sound policy in this field of municipal finance involves at least the following practices: (a) no borrowing to meet current expenses, or to meet expenses which are of a regularly recurrent character; (b) no borrowing for a longer term than the estimated life of the improvement (e. g., fire-station, schoolhouse, bridge, or street pavement) for which the loan is raised; and (c) adequate provision for amortizing or paying off the bonds when they fall due. These provisions may be made by the creation of sinking funds or by issuing the bonds in serial form, the latter method being by all means the better one. It goes without saying, moreover, that the funds obtained by borrowing should be strictly conserved for the purpose intended and not diverted to some other enterprise.

18. Central Purchasing

Is there an arrangement by which supplies required by the various city departments are purchased under competitive conditions, in accordance with rigid specifications, through a central purchasing agency? Much waste has resulted from the common practice of permitting each department to buy coal, oil, automobiles, gasoline, stationery, and office supplies independently, each patronizing a favored concern and obtaining merchandise of poor quality at a high price. It is desirable that the buying should be done by a central purchasing authority which prepares definite specifications as to quality, and calls for bids from all who desire to do business with the city. Standard specifications for supplies of every sort are now available and many of the best-governed cities use them regularly.

19. Per Capita Costs

Does the per capita cost of the various services, such as policing, lighting the streets, maintaining the schools, and caring for the poor, compare favorably with similar costs in other cities of about the same size and character? Cost per capita is not always a fair basis of comparison. Too much reliance should not be placed upon it. A higher per capita cost in any department may be fully warranted by the special conditions of an individual city—for example, the per capita cost of street lighting will necessarily be high in a city that has long, wide stretches of residential highway not closely built up. Still, it is always interesting and useful to compare cities on this basis and also on the basis of their relative costs per acre of area, per thousand dollars of assessed valuation, or per mile of streets. When a city stands high in all these tabulations, there is presumptive evidence of over-expenditure.

20. Unit Costs

Is the outlay for service in the various departments reckoned in terms of unit costs, and are these unit costs reasonable when compared with figures, similarly compiled, in other cities of about the same size? Conditions and problems may differ from city to city; in one municipality there may be more difficulty in meeting the public demands than in another; but such units as a square yard, a ton, a gallon, or a kilowatt are the same everywhere. If a designated type of street pavement, laid in accordance with standard specifications, costs one city a certain amount per square yard, there is no good reason why a neighboring city should pay twenty, thirty, or forty per cent more. Comparing unit costs is one of the best ways of discovering leakages. It should be a universal practice in cities, but relatively few of them use it regularly.

21. Audits and Financial Control

Is there a system of audit and financial control which ensures that all income is duly accounted for, and that no money is spent (a) without a specific appropriation, (b) without satisfactory evidence that the account has been approved by the department concerned, and (c) save in accordance with the laws, the city charter, and the ordinances? It is a fundamental rule of sound municipal finance that no bills should be paid from the treasury until an appropriation therefor has been made by the appropriating authority; that is, the city council or the city commission. The only exceptions are those cases where the state law makes a payment mandatory, irrespective of any appropriation. It is the function of the city comptroller or auditor to see that this principle is observed. It is not his duty, however, to determine whether the bills presented to him have been wisely incurred. The approval of the department which incurred the bill is ordinarily sufficient unless the auditor has reason to believe that there has been some error or crookedness. In order to help departments keep within their appropriations, the comptroller or auditor should inform them, at monthly intervals, concerning the amount of balances available.

22. Municipal Reporting

Are the reports issued by the city intelligible and informing to the ordinary citizen? Most municipal reports are not. People, as a rule,

are not interested in figures unless they are bedded in reading matter. Accordingly, the city's annual report should describe, in simple language and in an interesting way, the major activities of the year. Matters of routine administration should be given very little space. Illustrations and diagrams should be freely used. Some cities now issue their reports in admirable form, and these might well serve as models to other municipalities.

23. Civic Organizations

Is the city provided with civic organizations which follow closely what is going on in official circles and take a constructive part in the shaping of public policy? The work of governing a city should not be left entirely to the men and women whom we elect at the polls. The public officials cannot supply all the initiative and all the ideas. They should not be expected to do so. Chambers of commerce, boards of trade, labor unions, civic leagues, and other organizations ought to foster discussion and focus the attention of the whole people upon what goes on at the city hall. They should have committees at work studying the various problems of the community and thus be in a position to suggest ways of meeting difficulties as they arise. In every city there are hundreds of competent men and women who for various reasons cannot give their full time to the public service but who will gladly give a portion of it through work on unofficial committees. Does the city government make full use of these advisory agencies, or does it repel even the most constructive suggestions as an intrusion upon the prerogatives of the elect?

24. The Organs of Public Opinion

Are the organs of public opinion (particularly the newspapers) independent and helpful to the cause of civic education, or are they partisan to the point where they gloss over or conceal what the electorate has a right to know? Newspapers can be great constructive forces in any community. In many cities they are. What the average voter knows, or thinks he knows, about the government of his city comes mainly from the newspapers. A fearless newspaper, relentless in its quest for the facts, and thoroughly fair in its presentation of them, is the best friend of good government that a city can have.

25. Are the People Really Interested?

Finally, are the people of the city manifesting a live interest in civic questions? Does a large proportion of the enrolled vote come out at every election, or do large numbers of voters regularly remain away from the polls? What is the popular attitude between elections? Does the civic conscience stay awake or does it go to sleep? The alertness of the electorate is often looked upon as the least among all the criteria of good government, whereas it is the foremost and the most trustworthy of all. No form of charter, no scheme of departmental organization, and no system of checks and balances can ever secure good government for a city if the people as a whole have not been awakened to the fact that eternal vigilance is the only insurance against the abuse of power. The most serious indictment of the American municipal system is not its complexity, or its toleration of incompetents in public office, but the existence of a widespread civic apathy among the masses of its people.

The Value of Criteria

At any rate, here are twenty-five suggested criteria of a good city government. They are not intended to form a complete or definitive list. There are others equally applicable, and equally searching when applied. No two students of municipal government would agree as to what tests are the most vital and the most dependable. The foregoing are merely suggested as yardsticks which may be applied to the outstanding features of city government. They may afford a starting point for someone who can make a better list.

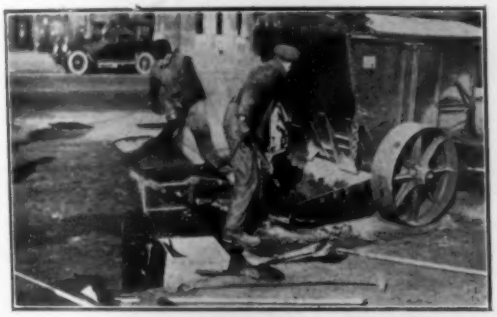
It should be borne in mind, moreover, that no test is automatically impersonal and that none can be applied with entire impartiality. Somebody has to apply the test, whatever it is, and he will always be influenced to some extent by his own temperamental leanings. It is far easier to ask the question "Does the city pursue a sound policy in the matter of borrowing?" than to answer it Yes or No. There are all degrees of soundness in this field of municipal policy. No city maintains an absolutely clear record in its borrowings, and indeed a temporary departure from sound principles may sometimes be quite justified. Political and economic theories must reckon with the realities of government and finance. So what we call criteria of good government are little more than guide-posts which show the right direction. Their value, if they have any, is in directing the citizen's mind towards the fundamental things when he becomes bewildered by the mass of details and inconsequentials. They help him get back to first principles.

Savings Through Patching Asphalt

By C. C. Hermann

THE average life of asphalt paving is from twenty to twenty-five years. It is estimated, however, that by patching the pavement and filling the cracks; in other words, by proper maintenance, at least ten years may be added to the life of the pavement. To take a concrete example, suppose a strip of asphalt paving cost $8 a front foot, what will ten years' additional life to that strip amount to to the property owner?

Bill Jones, we will say, lives on this asphalt street. He has a 40-foot frontage and therefore must pay an assessment of $320. He pays this in ten equal installments with interest at 6 per cent, making his annual payments range from $51.20 for the first year to $33.92 for the tenth year. The total interest he must pay is $105.60. In addition to this, he must set aside an annuity to finance the repaving at the end of



HAND MIXING ASPHALT PATCHING MATERIAL FOR REMOVAL TO REPAIR POINT BY WHEELBARROW

the 20 years, if he is a good business man, or at the end of this start out on another term of like payments for ten years. Assuming that the cost of the paving will remain the same, his annuity would amount to $8.69 per year at 6 per cent, thereby increasing his payment for the first ten years by this amount, and thereafter the sum of $8.69 per year for another ten years. At the end of twenty years, he will have sufficient in his annuity to take care of the repaving.

Suppose, however, that by proper maintenance by the city the life of the paving is increased ten years, making its life thirty years instead of twenty as formerly. Jones' annuity will be reduced to 4.05 per year. At the end of thirty years he has sufficient money in hand to pay cash for the repaving. In the first ten years he has paid for the original paving, making his total cash outlay for the thirty years $547.40, as compared with $599.55 under the

ASPHALT PATCHING ON MICHIGAN AVENUE, CHICAGO

twenty-year plan. Considering this comparison on a yearly basis, we have an interesting illustration of the importance of adequate maintenance. The annual payment of $8.69 over a period of twenty years, or $4.05 for thirty years, would practically continue indefinitely and be sufficient to renew a pavement each time at the expiration of its life. This shows a saving of $4.64, or 53.5 per cent per year, when the life is extended to thirty years. If maintenance is taken into consideration, the saving would be reduced by 23 cents. This would give a saving of $4.41 per year, or 50.7 per cent.

It is maintained by city engineers where portable asphalt plants are in use that a 50 per cent increase in the life of paving is quite possible. With a portable plant available, breaks in the paving are mended at once before they pound out under the weight of traffic. There is a considerable saving, too, in the city's owning the portable plant. The regular contracting charge per square yard for patching is $2. The high cost is due to the necessity of moving so many times. A careful check on patching shows that approximately 43 yards is required per year per mile of paving, bringing the yearly maintenance charge up to $86 per mile per year. With the portable asphalt plant, this cost can

PORTABLE PATCHING PLANT IN OPERATION, SHOWING SMALL FORCE OF WORKMEN NECESSARY AND MINIMUM EQUIPMENT REQUIRED

be reduced to $43 per mile per year, or $1 per yard. Assuming that the initial investment for the portable plant is $3,500, and allowing 10 per cent per year for repairs, interest charges and depreciation, a city having 20 miles of paving would have a yearly maintenance charge per mile of $60.50. The maintenance charge on the paving in front of Mr. Jones' property would amount to approximately $0.229 per year, or $13.74 for maintenance over a period of 60 years, as compared with $352.20 saving for this period, due to its purchase and use.

Periodic versus Continuous Reading and Billing of Meters

By J. E. Gibson

Manager and Engineer, Water Department, Charleston, S. C.

THE advantages of continuous reading and billing of water-meters over periodic reading are many. It certainly reduces the congestion in the office, keeps the office force occupied under a systematic routine, and eliminates materially the possibility of errors, on account of the fact that the work goes along in a systematic and orderly manner without periodic bursts of speed and long hours of overtime.

When the city of Charleston purchased the private water company, conditions were found to be chaotic. The industrial and commercial meters were read monthly, and billed accordingly. A percentage of the domestic meters were read quarterly and billed immediately after reading. The flat rates were billed quarterly. Then at the end of the year the domestic consumers were given an adjustment, provided they had not used the minimum for the twelve months but had overpaid during some quarter, the contract being made for yearly service rather than for a quarterly period.

The first resolution adopted by the Commissioners was one authorizing universal metering to do away with flat-rate consumers. The city was divided into nine major districts, with a tenth district known as the monthly or commercial district, where, because of the large consumption, the meters are best read monthly. These districts were then divided into routes and the routes limited not to exceed 150 meters each. The order of reading was to commence at the first district during the first month of the year, District No. 1 being read in the first ten days of the month, District No. 2 in the next ten days, and District No. 3 in the next ten days; the reading then proceeding to the fourth, fifth, and sixth districts in the second month of the quarter, and to the seventh eighth, and ninth districts in the third month of the quarter, repeating the above order at the beginning of the fourth month. As laid out, this means the reading and billing of about 200 meters each day. Then, toward the end of the month, there is the monthly district to be read, which increases the work for only the first few days of the succeeding month.

Bills are due and payable within [illegible] of rendition, so that 200 meters are read each day, the following day the bills are made out and mailed, and within the next ten days probably 90 per cent of them are paid. The total number of bills paid in dollars is summarized each day, which, added to the previous amount billed and collected, gives the total amount of water in cubic feet and dollars billed up to and including that day, with the total amount of rates, so that, in effect, a perpetual balance is carried and at the close of each business day it is possible to know the exact amount of money owing the department for water billed. This is found to equalize the work in the office, reduce the number of errors, and give the department ample working funds to discount bills and meet its obligations promptly.

A record is kept of the errors made in reading, billing, and collecting. At first, the keeping of this record was objected to by some of the employees, but after they found that the purpose of it was not to use it as a lever to jack them up or scold them for dereliction of duty, but rather to foster a spirit of reducing errors, it met with the approbation of all, with the result that errors have been greatly reduced in all department. During 1925, the total number of errors in approximately 50 000 readings was only 15. Of course, there may have been more, but they were not caught This is an enviable record, and while it is hoped to reduce errors in the future, it will be pretty hard to do so.

The Lighting of Business Districts

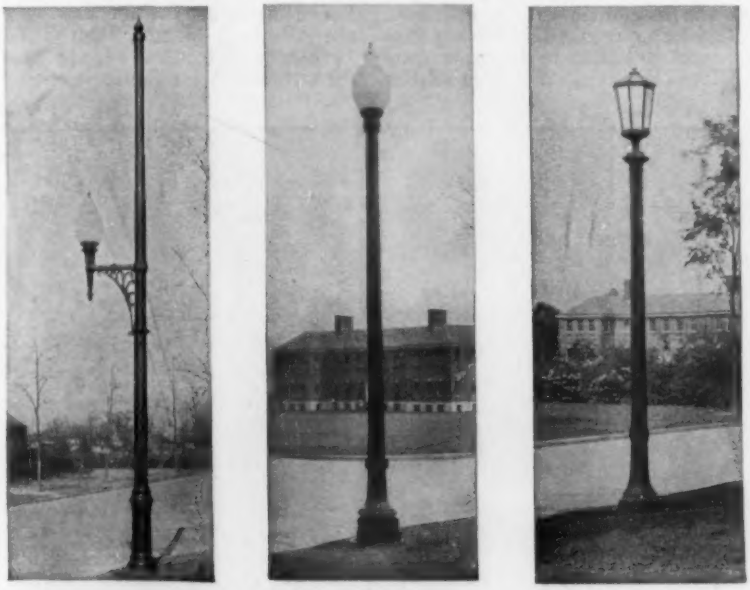
Progress in the Art of Illumination Is Probably the Largest Single Factor in the Development of the Night-Time Use of City Streets

IN business district lighting, esthetic considerations demand a pleasing and dignified appearance of lighting equipment. The system must be efficient, easy to install and operate, and reliable in service. The illumination provided should be sufficient to dispel gloom and to give maximum safety and convenience to both automobile drivers and pedestrians. The equipment should be so designed as to allow a sufficient amount of upward light to illuminate adequately the façades and upper cornices of the building.

Special equipment, construction and maintenance costs are practically constant, depending little upon the size of lamps used. Electrical energy and lamp renewals, the outstanding variables, contribute but a minor proportion of the total annual operating costs. This fact, coupled with the urgent need for better illumination because of traffic congestion and more liberal use of the streets at night, is responsible for the distinct trend toward the use of larger lamps in street lighting.

Modern practice in the large city calls for one or two large lamps per post. The four- or five-light clusters using small lamps—splendidly the vogue before the introduction of the high-powered gas-filled incandescent lamp—logically give way to the important increase in efficiency now obtained by the use of large modern lamps. In the smaller cities and in the secondary business districts of the large city, one somewhat smaller lamp per post meets the requirements. The use of alabaster rippled glass has material advantages over the plain white diffusing glass, as it is more efficient in the transmission of light and gives pleasing sparkle and animation to the unit.

Modern lamps are rated in lumens. For a nominal candlepower rating, the number of lumens is divided by 10. For example, a 25,000-lumen lamp gives approximately 2,500 horizontal candlepower.



THE BUSINESS DISTRICT IS THE SHOW WINDOW OF A CITY, AND, LIKE THE SHOW WINDOW, ITS PROGRESSIVENESS IS DOUBLY ASSERTED WITH PROPER LIGHTING

In the business districts of cities of 50,000 to 500,000 population, the usual practice suggests one or two lights per post, with a maximum of two 25,000-lumen lamps per post and a minimum of one 15,000-lumen lamp per post. The spacing is from 100 to 125 feet, and the mounting height 18 to 25 feet, with the units arranged opposite.

The lighting of business districts in cities

of 20,000 to 50,000 population is usually accomplished by standards with one light of from 10,000 to 15,000 lumens. The standards are spaced 90 to 115 feet apart, with the light unit at a height of 15 to 18 feet, and placed opposite.

In the business districts of cities of 5,000 to 20,000 population, there is usually one light per post, the light ranging from 6,000 to 10,000 lumens, the posts being spaced 80 to 100 feet apart, and the light unit mounted 14 to 16 feet high, the units being placed opposite.

For cities of less than 5,000 population in the business district, there is one light per post, the lamp ranging from 4,000 to 6,000 lumens, the posts spaced 80 to 100 feet apart, and the mounting height from 13 to 15 feet. The posts are arranged opposite.

Pouring the Foundation for the New Los Angeles City Hall

IN the foundation for the 28-story tower of the new Los Angeles City Hall, the architect's specifications call for over 2,800 yards of concrete to be poured in one continuous operation. This great volume of concrete was poured in slightly over 30 hours, or at the rate of nearly 100 yards per hour.

When it is realized that over 4,000 barrels of cement were required, it is possible to visualize to some extent the magnitude of the operation and the careful planning required in having materials and equipment available to insure a constant stream of fresh concrete. The area of the slab is nearly 12,000 square feet, and in no case did the concrete have a chance to harden before it was again covered with fresh concrete.

In order to insure a uniform workable concrete of dry consistency that would quickly and easily flow into place around the reinforcing bars, Celite was used at the rate of three pounds per bag of cement. A 1:2½:3½ mix was used for all concrete.

The architects for the Los Angeles City Hall are Albert C. Martin, John C. Austin and John Parkinson, Associated. Lange and Bergstrom are the contractors for the foundation.

NEARLY 3,000 YARDS CF 1:2½:3½ CONCRETE WAS POURED IN THE FLOOR SLAB OF THE LOS ANGELES CITY HALL IN THIRTY HOURS WITH THE EQUIPMENT SHOWN ABOVE

Municipally Owned Light and Water Plant Helps City Treble Its Population

Jonesboro, Ark., Grows from a City of 5,000 in 1906 to Nearly 15,000 in 1926

THE privately owned water and light plant of Jonesboro, Ark., was purchased by the city July 1, 1906, the manager of the private company being retained as manager under municipal ownership. Jonesboro was at that time a town of only 5,000 population, with no street paving and only a few brick walks in the business and residential districts. Inspired by the vision of the people in 1905, due to the need of a sewerage system, negotiations were begun for the purchase of the plant. This was accomplished, together with the constructing of a sewage system, which has been handled and financed by the plant without cost to the city or the property owners. The management has maintained the plant in prime condition through the installation of the most economical machinery in both the electric and the water department, always ahead of the anticipated demand for service.

In 1909 a new street series system was installed, locating a 100-candlepower lamp, center span, at every street crossing, making a total of 236 street lights. In connection, a white way system was installed, which, with extensions, now covers two business streets and consists of 85 four-light posts. The water and light plant receives no compensation for the lighting of the city's streets and white way system, but maintains and operates the system out of the earnings of the plant. Later, when the city paved many miles of its streets with asphaltic concrete, all new service lines extending to the curb were relaid, which has been a big factor in reducing maintenance cost on the streets. At the same time the city began metering all services, which has reduced pumping about 50 per cent.

THE MUNICIPAL LIGHT AND POWER PLANT AT JONESBORO, ARK.

Builds Complete New Plant

The record of the earnings of the city water and light plant is such that in 1925 when $200,000 was needed to build and equip a new power-plant, the bonds were sold without the forming of an improvement district, the property alone being security for the bond issue, an unusual piece of municipal finance in this state. The plant now nearing completion, constructed of brick, steel, and concrete, will be one of the most modern and best-equipped plants in the state. Two of the latest type 500-horsepower water-tube boilers, with 100-degree superheat, 200-pound steam pressure, and an overload rating of 250 per cent, are now in operation.

These boilers are fired by a set of mechanically operated stokers, equipped with dual drive and controls. The coal is conveyed to the stokers by an electrically operated monorail system. With this system, coal is delivered from the cars either to stokers or to a coal storage yard, from which it may be reclaimed later. A new 1,500-kw. turbine, with condenser and additional spray pond equipment, is being erected and will be operated in connection with a 750-kw. turbine, and a 750-horsepower Corliss engine, giving the plant a capacity of about three and one-half times the present demand. The plant is so built that additional boilers and turbines may be installed to take care of future demands for current. The new plant building will also house a complete new machine shop for repair and maintenance of equipment.

During the last year the water and light plant has built an extension to the sewerage system, together with a new septic tank, at a cost of about $20,000, and has paid for all these improvements out of the earnings of the plant. This work has been in addition to improvements in the water and light system. The growth of the property has more than kept pace with the demand for service. There are at present 130 miles of electric lines, supplying light and power to 2,465 consumers, 26 miles of water-mains, 167 fire-hydrants, and a daily pumpage of 1,500,000 gallons to 2,800 water consumers.

In 1923, a complete substitution known as the Culberhouse pumping-station, with a reservoir of 320,000 gallons capacity, was built. This station is equipped with two motor-driven centrifugal pumps with a capacity of 700 gallons per minute each, and is cross-tied into all the important mains leading from the power-house to the standpipe. Water equipment in the power-house consists of one 2,000,000-gallon compound steam pump; two motor-driven centrifugal pumps of 1¼ million gallons each, and five wells which deliver 1,600 gallons per minute to a large storage reservoir.

Plant Owns Office and Storeroom Building

In 1924 an office building and storeroom was purchased at a cost, including fixtures, of $45,000 from earnings of the previous years. This building is a permanent home for the department and is adequate for the offices, the testing department, and the consolidation of the storerooms. The investment is paying large returns through efficiency and service by saving in waste of material and employees' time.

Growth in Revenues

The terms of the original bond issue for the purchase of the plant from private ownership provided for a special assessment against all property of the city of Jonesboro for a period of twenty years, as a means of securing funds with which to retire the bonds. After eleven years the earnings of the plant had increased to the point where the Commissioners felt justified in suspending further collections, as the profits were sufficient to provide a sinking fund for the retirement of the bonds and at the same time to take care of all improvements and expenses. The tax collected aggregated $263,707.31, which represents the city's investment in water, light, and sewer systems. The carrying charges of the bond issue from 1906 to 1923, inclusive, amounted to $213,106.20, which if applied against tax collections leaves an investment of only $50,601.11. By applying this balance against the cost of the sewers, $98,697.38, it will be observed that the earnings of the water and light plant have liquidated the cost of the plant and $48,096,27 of the cost of the sewers.

Management

The manager of the plant is appointed by a Board of Commissioners, who are elected by the property owners, each property owner having one vote for each dollar of state and county taxes paid. That this is a most successful method of managing a municipal plant is attested by the record of the plant and the continuous good service given to the people of Jonesboro under the period of municipal ownership, during which time the plant has been under the continuous management of J. F. Christy.

Public Sewer Systems for New Realty Developments Essential

THE New York State Department of Health in its weekly publication, *Health News*, calls attention to the possibility of creating conditions of public nuisance and menace to health through the installation of individual sewage-disposal devices on the small lots of present-day real estate developments.

The warning is a result of the intensive development of the water-front along southern Long Island, N. Y., by digging lagoons, filling marshes, and subdividing this made land into small lots. A public sewer system with adequate treatment would obviate any possibility of menace to health. The first cost to the property owners might be less and in any case should not be much in excess of the cost of individual plants, while the expense of maintenance of a public system should be very much less than the cost of maintaining individual disposal plants.

In previous cases of this kind, the installation of a public sewer system has usually not been considered until after the property owners have expended considerable sums for individual treatment plants. In view of these conditions, the New York State Department of Health is taking the initiative in presenting the advantages of public sewer systems to the various real estate companies developing water-front property and urging the formation of sewer districts under the Town Law. By this procedure sewers and adequate treatment works could be installed under the direction of the town government and paid for by direct tax against the property benefited, bonds being retired during a period of from twenty to thirty years.

What Fares Are Best?

By Walter Jackson
Fare and Bus Consultant, Mt. Vernon, N. Y.

ONE of the most common errors in the laymen's view of city fares is that a lower rate—by which he usually means 5 cents—will increase riding to a profitable degree.

The proponents of this view do not realize that its soundness depends upon two important factors—the average length of ride and the relative ratios of compulsory and voluntary traffic.

Where Lowest Fare Is a Matter of Self-Interest

Consider first the factor of average length of ride:

Here is a town of 25,000 inhabitants. The average distance between the heart of the town and its residential area is but 1 to 1½ miles, the total length of the route from center to boundary being not more than 2½ miles. Within this space, cars are run at intervals of 7½ minutes during the rush hours and of 10 to 15 minutes in the non-rush hours.

Obviously, any fare increase which the public does not consider just will be harmful to revenue: first, because the intervals between cars are long enough to encourage walking if a car has been missed; second, the smaller the town, the more important is the personal machine in depriving the public transport system of business. The non-rush rider, in particular, will be able to beat the following car by walking or else he will be picked up by a neighborly autoist.

Under such circumstances, the wise transportation manager realizes that few persons are compelled to use his service. He will therefore try to keep the fare for regular riders as low as he can, purely as a matter of self-interest. His ability to do so will hinge partly on the nature of his fare schedule and partly on the degree of relief he can get from such monopoly-day taxes as paving, bridge assessments, street sprinkling, snow-removal, etc.

In practice, few 5-cent fares have remained. The tendency has been toward a 10-cent cash fare moderated by token or ticket rates such as four for 25 cents, seven for 50 cents, and twelve for $1.00, available to all but truly casual riders. In some cases, the scheme has been supplemented by the weekly pass plan mentioned later.

It should be stressed that the problem of a popular fare for small towns is greatly complicated by the fact that so large a portion of the population now looks upon the public transport system as a standby or emergency medium to be used when it cannot "roll its own." Obviously, "standby" users ought to pay a "standby" price, but this is not as feasible with a dispensable article like transportation over 1—2—3-mile distances as it is with water or electricity supply.

Substitution of busses for cars is far from a universal remedy. Sometimes such replacement has been made because there was no quick way of shaking off old-time monopoly obligation, and sometimes to permit an expansion of facilities (into new areas) with less new capital than a permanent way would require. True enough, there is much glib talk about the public's willingness to pay higher fares on the bus than on the car. Unluckily, the persons who chatter this way are not the workers and clerks but the auto-using members of the chamber of commerce or the Gyratory Club. Bright busses succeeding antique trolleys do draw more business, but they are probably less immune to auto inroads than a really modern electric car.

It is lucky for many a municipality today that so many of the smaller transportation properties are owned by the local power and light concerns. The latter usually is making a go of its central station business and would rather lose a small sum in its transportation department than get into a turmoil over the abandonment of car service. Where such fears have not obtained, the railway has been abandoned completely and the town left to the tender mercies and uncertain service of the taxi-

The Best Fares Are Those Which Are Built Up on a Merchandising Plan

The weekly pass and 5-cent short-haul fare embody merchandising principles, because they encourage the use of the service during hours and over distances that are not patronized under the customary flat-rate scheme.

FOUR TYPES OF STREET RAILWAY PASSES

Standard weekly pass; student's special-rates weekly pass; tourist's pass for use throughout city and suburbs; one-day pass for Sundays or holidays

cab and jitneur. Most small-town replacements of trolley by bus are really made with a view to minimizing losses rather than enhancing profits.

The Bulk of Large City Traffic Is Not Affected Seriously by Higher Unit Fares

When the average length of haul exceeds 1½ to 2 miles and the downtown area cannot readily give parking space to all auto owners, the effect of an unpleasant increase in unit fare is nowhere nearly as disastrous as in the small places we have been discussing. The larger cities also enjoy shorter headways between cars, so that a person who has missed a car knows he will not save time by starting to walk.

The "pick-up" willingness of autoists also decreases as the size of the town increases.

This brings us to the second factor, viz., the relative ratios of compulsory and voluntary traffic.

It has been the writer's experience through application of the weekly pass that one-third to one-half of the revenue comes from what might be termed the compulsory traffic. This is the riding betwen home and job twice a day. An increase in fare in cities of 50,000 or more seldom causes a reduction in riding severe enough to offset the increase in the rate of fare because practically all of these industrial riders remain.

The losses that do occur are among the off-peak riders, and these may include not only the shopper but the rush-hour rider who has been going home to lunch and riding downtown at night to the movies. These losses will be of relatively less importance as the size of the city increases. For example, home-to-lunch riding is a much smaller factor in a city of 150,000 than in one of 50,000; and in the evening, the amusement seeker in the larger city can walk to a neighborhood playhouse.

However, while the net result to the railway may be more revenue, the community itself is injured to whatever degree the higher fares cut down the free intercourse of its citizens. It

is not a good thing that a poor man's family should have to refrain from a day in the parks because carfare is prohibitive, or that persons should be satisfied with the telephone as a substitute for personal shopping or house-to-house visits.

A Fare Plan Which Combines Revenue with Maximum Usefulness

This civic aspect has led the writer always to advocate a fare plan which will combine maximum revenue to the operator with maximum usefulness to the community. In the earlier developments of this plan, the existing cash and ticket fares remained unaltered; in some recent cases, the cash fare has been raised to 10 cents and the token rate changed little or not at all. The new fare in all cases has been the addition of an unlimited-ride, transferable weekly pass, and in some cases, also, of a 5-cent short-haul fare.

The purpose of the pass, sold at anywhere from twelve to twenty ticket fares, is to produce a lower fare per ride to the regular rider or to the person to whom he transfers his pass. The best explanation of the plan is to consider an actual installation.

In a certain city of some 32,000 inhabitants, the local trolley system, though well maintained, was suffering a steady drop in revenue. The chief cause given was "more automobiles." The fares were 8 cents cash and 7 1/7-cent tokens sold at the rate of seven for 50 cents. About half the rides were taken at the cash fare, which gives a pretty fair line on the proportion of the public which used the service only occasionally.

In April, 1925, the City Council approved a new fare schedule: 10 cents cash for casual riders; the retention of the 8-cent fare to those who would buy five tokens for 40 cents; and the replacement of the 7 1/7-cent token by a $1.00 unlimited-ride weekly pass. It will be seen from this that the local autoists or visitors would be the only ones paying a higher fare, while the truly regular rider had unlimited rides in exchange for guaranteeing two rides a day in advance at the discarded token rate.

The effect of this plan has been most happy from both the railway and community standpoints. The railway has obtained from 12 to 33.5 per cent increase in revenue and operates more smoothly with the 10-cent cash fare than it did with the change-requiring 8-cent fare. The community, although paying about ¼-cent more per ride, takes many more rides.

Why the Unlimited-Ride Weekly Pass Is So Popular

There is no magic about all this. The chief reason is that the pass price is so popular that it produces about 30 per cent of the revenue and 40 per cent of the riding. This means a relatively high number of passholders. Most passholders are family heads who pay for others when taking extra rides with them. The passholder has no occasion to carry tokens for himself, so he will often pay for companions in dimes instead of tokens.

The upshot is that in a number of months this property is showing more riders at 10 cents than it did at 8 cents. Such a result would be impossible if it were not for the passholder's more or less unconscious attraction of 10-cent business.

It is clear that if the public did not feel that this schedule was the embodiment of justice to retail, semi-retail and wholesale users of the service, the scheme would not work.

Five-Cent Short-Haul Fares Create New Business

In one very large city, the weekly pass has been supplemented by 5-cent short-haul fares. The idea in this case is to encourage persons to ride to and from local shopping and amusement centers. A large proportion of such 5-cent short-haul riding is entirely new business. The application of this plan, of course, is contingent on the nature of the existing fare-collection scheme and on the prevalence of very short headways from the overlapping of several car routes on the "Broadway" of the 5-cent area.

This is very different from the 1923 experiment of the Seattle Municipal Railway in which a general cut from 10 cents cash and 8⅓ cents token to 5 cents cash fare produced an average increase in riding of only 8 per cent. This test surely showed that in a large, widespread city like Seattle the great mass of the riding is compulsory. It is not unlikely that 5-cent short-haul fares would actually have added to the city's revenue, for they would have had an extra attractiveness in comparison with the long-haul rates.

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Methods and Costs of Street Cleaning in Kansas City, Mo.—Part I

From a Report by the Kansas City Public Service Institute

KANSAS CITY has 673 miles of paved streets and boulevards. Ninety-seven miles of this total are in boulevards, leaving 576 miles, or 8,962,000 square yards, of paved streets to be cleaned by the Street Cleaning Division of the Public Works Department. The Park Department cleans the 97 miles of boulevards, representing approximately 2,000,000 square yards. Of the 8,962,000 square yards cleaned by the Street Cleaning Division, about one million square yards are in the downtown district. This area is cleaned every day, while the rest is cleaned on an average of once each two weeks, some being cleaned daily and some not oftener than once a month. The cost of cleaning the 8,962,000 square yards per year is approximately $250,000, and the cost per person living in Kansas City is about 65 cents.

Street cleaning includes sweeping the streets and cleaning catch-basins and sewers. The Commissioner of Street Cleaning is the head of the division, assisted by a Deputy Commissioner of Street Cleaning, to whom the district foremen report. There are three district foremen, each in charge of approximately one-third of the geographical area of the city. Under these district foremen are foremen who direct the laborers and cartmen, chauffeurs driving trucks, and barn men taking care of horses and stables. There is also a repair shop at which a blacksmith, repair men, and laborers take care of miscellaneous repairs.

The work performed may be roughly divided into five classes: (1) cleaning streets by flushing; (2) cleaning by hand sweeping, using push-carts and brooms; (3) cleaning by horse-drawn carts and men with brooms and shovels, cart patrol; (4) cleaning sewers and catch-basins; and (5) the upkeep and repair of barns and stables and the care of horses. Repair and maintenance of motor equipment is taken care of at the city garage, which is not under the Commissioner of Street Cleaning. Four drivers or chauffeurs and four laborers with two flushers clean approximately 800,000 square yards of street daily. Fifteen foremen, with 30 cartmen, 44 laborers, and two chauffeurs, clean approximately 800,000 square yards daily by the cart patrol method. Two foremen, with 45 laborers and one chauffeur, clean approximately 750,000 square yards by the hand patrol method daily. One foreman and two laborers with a small truck clean catch-basins and sewers.

Districts

The city has been divided into three districts, known as Districts Nos. 1, 2, and 4, for the purpose of centralizing the supervision nearer to where the work is done. District No. 3 is a hybrid made up of parts of Districts Nos. 1 and 2.

District No. 1 has 2,200,000 square yards of paved streets. Some of this area is cleaned daily, and the rest once a week. Of the total area in District No. 1, 250,000 square yards are flushed, 105,000 square yards are cleaned by hand sweeping, and the remainder cleaned by cart patrol. The barn is located in about the center of the district on city property and very adequately meets the demand for street cleaning in this district.

District No. 2 contains 3,000,000 square yards of paved streets, of which 450,000 square yards are flushed, 1,250,000 square yards are cleaned by hand sweeping, and the remainder is cleaned by cart patrol.

District No. 4 contains 3,762,000 square yards of pavement to be cleaned, 200,000 square yards of which are cleaned by flushing, 100,000 square yards by hand sweeping, and the rest by cart patrol.

District No. 3, made up of parts of Districts 1 and 2, is the hand sweeping district, in which most of the area is covered by "white wings." It was created for the purpose of supervision of hand sweeping, which largely duplicates areas that are cleaned by flushing.

Inspection

There is no provision in the administrative code for the employment of street cleaning inspectors. Nevertheless, such work is now being done through the foremen, the commissioner, and the deputy commissioner. The work of street cleaning inspection is of two kinds. One kind of inspection of primary importance is the inspection of the work done by the street cleaning division itself. This is now being taken care of by the commissioner and deputy commissioner. The other class of inspection—of almost equal importance—is the

following-up of contractors during construction of alteration work when adjacent streets are likely to be littered with débris and repair materials. This sort of inspection is not and cannot be done by the commissioner, deputy commissioner, or district foremen, any more than building inspection or boiler inspection can be done by the commissioner of buildings. It is necessary to check each job to see that the streets are kept clean and left clean. A large amount of construction work is being done in Kansas City, making this a large task.

Contractors are required to make a cash deposit of $10 before starting work. This deposit is not large enough, however, to enforce the ordinance without consistent inspection. The provisions now in force allow the contractor the use of one-third of the street in front of the property on which he is working, and require him to keep the premises clean at all times. The cash deposit may be forfeited to the city if the contractor does not comply with the above conditions. However, there are few records of forfeiture, though the street cleaning division often does the cleaning.

CART PATROL METHOD OF CLEANING STREETS IN KANSAS CITY, MO.

Records

Records now kept in the street cleaning office consist of daily reports from all foremen, giving information concerning the location of each day's work, the number of blocks cleaned on each street, and the number of men working. The records thus prepared from the foremen's daily report necessarily contain inaccuracies, such as misstatements as to the location of cleaning, repetition of blocks cleaned, and a summation of the number of blocks cleaned based on the number of times the man walks up or down the block. Examples of the discrepancies in record material are: A hand broom man, in cleaning a block, first goes down one side of the block, counting this a block, and then comes back on the opposite side, calling this another block. Two cart gangs overlapped one block on several streets. One showed certain streets to have been cleaned from Eighth Street to Twelfth Street, while the other showed the same streets as having been cleaned from Independence Avenue to Ninth Street. These slight discrepancies are due to errors in recording which could be checked back immediately and corrected by the record clerk.

Cost Records

No system of cost records is kept. Neither time nor cost of materials is distributed. An accurate unit cost system requires a daily distributed charge of such items as salaries and wages, repairs, materials, hay, grain, etc. It is not possible now to determine without a great deal of work the amount of hay and grain it takes to feed horses for any given period. Neither is it easy to determine the cost of repairs to equipment. Records of a financial nature, of course, are kept in the accounting division of the finance department, but records showing the unit costs for the different kinds of cleaning and the various periods should be kept by the street cleaning division of the public works department.

Accurate comparisons cannot be made if the information available is not in terms that are comparable. To compare the work done by

two different methods in terms of blocks cleaned is useless, unless the same blocks are cleaned. A block east and west on any numbered street may be 330 feet, while a block south of 31st Street on a north-and-south street may be 660 feet. The width of the street may vary from 20 feet to 90 feet. Cost records should be kept on a basis of area in square yards.

Methods of Cleaning

Until recent years practically all street cleaning was done by hand, that is, by hand patrol and flushing, which is carried on by means of short lengths of hose or by horse-drawn sprinklers. The advent of fast-moving motor-driven traffic has changed the character of street dirt and its location on the street. Along with this there has been a gradual advance in street cleaning methods developing the several methods of mechanical cleaning, that is, rotary sweepers, flushers, squeegees, power flushers, pick-up sweepers and vacuum sweepers.

Rotary broom sweeper.—The rotary broom sweeper consists of a rotary broom drawn at first by horses and later by motor-driven trucks. This machine swept the dirt from the street to the gutter, where it was picked up in small carts or trucks and hauled away.

Flushers.—The first flusher developed was equipped with a tank from which water under air pressure flowed. This equipment was first horse-drawn and then motor-drawn. These machines washed the dirt into the gutter or, where the slope was considerable, to the sewer.

Squeegees.—The squeegee is an adaptation of the horse-drawn flusher with a rotary rubber broom or mop, which with water was supposed to wipe the street dirt to the gutter.

Power flusher.—The power flusher is an improvement over the flusher described above. It is a tank mounted on a truck chassis equipped with a separate motor-driven pump to supply pressure. The nozzle arrangement is such as to distribute the water most effectively. This machine is very flexible and may be adapted to almost any grade. It is most effective on smooth pavements.

Pick-up sweepers.—The pick-up sweeper is a machine working on the same principle as a carpet sweeper. It is equipped with a rotary broom, and dirt and dust are collected in much the same manner as with a lawn-mower provided with a canvas attachment to catch the grass. The sweepings are picked up and deposited in a storage bin of 2 to 3 yards capacity. When this bin is full, it may be emptied or detached and an empty one inserted in its place. The sweeper is equipped with a water-tank from which enough water is sprinkled ahead of the broom to prevent the scattering of dust.

Vacuum sweeper.—The vacuum sweeper is a machine exactly analogous in principle to the ordinary domestic appliance by the same name. It has a rotary broom and conveyor pick-up for the heavier particles and a suction fan to pick up the dust and fine particles. This machine does not perform effectively when the streets are wet.

Methods Used in Kansas City

Flushing.—There are in use in Kansas City one Pierce-Arrow 1,500-gallon double-unit flusher and one White 1,500-gallon double unit flusher. Both are about one year old and cost originally approximately $7,000 each. They are equipped with power-driven pumps and front and side nozzles. These nozzles may be adjusted to any desired height. The machine can flush effectively a width of about 30 feet at a speed of 2 to 4 miles an hour. Only one of the two front nozzles is used in Kansas City, the drivers giving as a reason that one nozzle in front supplies enough water.

With these flushers about one million square yards of street are flushed. About 800,000 square yards are flushed daily and the rest three times a week. This represents a total of approximately 65 linear miles of street. Of this amount, over one-half is flushed at night. The district covered by flushers is downtown area. The area flushed by each flusher during eight hours averages about 200,000 square yards, or 15 miles, of street. With few exceptions, the flushers travel at too high a speed for efficient results. In some cases little more than sprinkling is done because of the rate of speed. In outlying southern districts observation has shown that very good results were obtained at proper speed control and pump pressure.

While supervision of flushing is under the deputy commissioner, there is no one whose primary work is to supervise the flushing. Certain areas are assigned to each flusher, and since most of this area covered by flushing is also covered by hand patrol, little attention is given to efficient flushing. Each flusher has a driver for each 8-hour period and a laborer to make connections for the water-supply and other miscellaneous work. Each flusher works 16 hours each day.

The following table gives flushing information from various cities received by the St. Louis Bureau of Municipal Research during the summer of 1925 and is representative of what and how flushing was being done at that time. The cost per 1,000 square yards varies

from 4.4 cents to 37 cents. Most of the refuse is flushed to the gutters, indicating that the dirt must be picked up by supplemental forces. The answers to the question, "Is flushing economical and effective?" are all "Yes" as to effectiveness and all "Yes" except from Los Angeles as to economy. All double-unit flushers were operated by two men, except in Los Angeles, Cincinnati, and Denver; Los Angeles and Cincinnati using one man and Denver three. In Denver, however, two of these men work the street with brooms along with the flushing.

RESULTS OF A QUESTIONNAIRE ON FLUSHING SENT OUT BY THE ST. LOUIS BUREAU OF MUNICIPAL RESEARCH, MAY 8, 1925

City	No.	Type	Gallons Capacity	Men Per Flusher per Shift	Hours per Day	Cost in Cents Per 1,000 Sq. Yd. Incl. Int. and Dep.	Refuse Flushed to Sewer or Gutter	Is Flushing Economical and Effective?
New York	167	Single unit	1,600	1	8	8.4*	Gutter	Yes
Chicago	18	Double unit	1,500	2	16	10.5*	Gutter	Yes
Philadelphia	2	" "	1,500	2	18	13.2	Sewers	Yes
	21	Single unit	1,500					
	3	" "	1,750					
	10	" "	2,750					
Los Angeles	1	Double unit	750	1	16	31 to 37	Sewers	Effective
	4	" "	1,200					
	5	Single unit	1,200					
San Francisco	2	Double unit	1,200	2	8	14.0*	Both	Yes
Cincinnati	4	" "	1,500	1	10	4.4*	.....	Yes
Kansas City†	2	" "	1,500	2	16	10.4*	Both	Yes
Seattle	3	Single unit	1,200	..	..	14.0*	.....	.....
Portland	8	Double unit	1,200	4	16	30.0	Both	Yes
Denver	10	Single unit	700	3	8	.59 per block	Gutter	Yes
Akron	2	Double unit	1,500	2	16	29.0	Gutter	Yes

*Interest and depreciation computed by the Kansas City Public Service Institute. †Kansas City inserted by the Kansas City Public Service Institute.

Sweeping.—The equipment used in hand sweeping consists of small push-carts, shovels, and brooms. Each man, with a broom, shovel, and push-cart, is assigned to certain blocks. He goes to work at 7 A. M. and follows both gutters, picking up paper in the street or on the sidewalk. He usually sweeps the entire length of the block along the gutter and then turns a hydrant about half-open, washing the loose dirt along the gutter into the catch-basin. Most of the territory covered by hand sweeping is cleaned twice daily by this method and the remainder once a day. The supervision of hand sweeping appears to be excellent. The work is being done consistently, and very good results for the hand patrol method are obtained.

Th operation of this method of cleaning by opening hydrants has been observed, and the method as outlined below has been corroborated by the district foremen and the foremen. The hydrant valves are opened sufficiently to secure a proper flow of water into the street on each side of the block for an average period of five minutes. Standard hydrants are equipped with two 2½-inch openings and one 4-inch opening, so arranged that the 4-inch opening opens straight into the street, with the 2½-inch openings on the side. The opening most conveniently used by the street cleaning employee is the 4-inch. There are times when the 2½-inch openings are used. The hydrant pressures vary from 50 to 120 pounds. The average downtown hydrant pressure is about 90 pounds per square inch. Assuming that the hydrant valve is opened on an average 1½ inches with an average pressure of 90 pounds, computation shows that this gives a flow of about 42 cubic feet per minute, or 210 cubic feet in five minutes.

By hand sweeping, 45 broom men sweep an average of 435 blocks once over. Some blocks are swept more than that. Under normal conditions there would be at least 870 hydrants open each day. The amount of water used per day on the basis of the square yards cleaned during the week of May 8 to 15, 1926, and 435 blocks per day, would then be 182,700 cubic feet per day, figured as follows: 742,000 square yards of pavement cleaned in one day, 870 hydrants opened per day, 210 cubic feet of water used per hydrant, giving 182,700 cubic feet per day, or 246.2 cubic feet per 1,000 square yards of pavement cleaned. The total cost of water used by the patrol broom men, based on the lowest water rate of 6 cents per 100 cubic feet, is $110 per day, or 15 cents per 1,000 square yards cleaned.

Horse-drawn carts (cart patrol).—The equipment for cleaning by the horse-drawn cart method consists of 32 horses and 32 two-wheeled carts, and other miscellaneous equipment such as harness and barn and stable equipment. By this method, a foreman who has been assigned to a certain district takes two one-horse carts and their drivers with from two to four laborers with brooms and shovels, and proceeds down the street to be

cleaned, taking both sides of the street, sweeping into piles and shoveling the refuse material into the carts, after which hydrants are opened and gutters washed.

The area covered by horse-drawn carts represents 80 per cent of the total street area to be cleaned, or 7,800,000 square yards. Streets are cleaned by this method on an average of once each two weeks. There is considerable variation in the time of cleaning. Some districts are small and can be cleaned in one week. Others are too large to be cleaned in two weeks with the present organization. The district south of 47th and west of Prospect Street takes about four weeks to cover. All cleaning is done during eight hours of daytime work. Cleaning by this method is practically confined to gutters, but just the coarse material and heaviest débris is picked up. Supervision is through 15 foremen, the work being done by 45 laborers and 30 drivers and carts.

One disadvantage of the economy of this type of cleaning is the location of the dumps. About four to five loads per day are all that one care can haul, on account of the distance.

Practically the same method is followed in opening hydrants under this method as under hand sweeping, except that the foremen open and close hydrants. The hydrants are opened about half-way for an average of approximately 5 minutes. About 500 blocks are cleaned by cart gangs per day, requiring 1,000 hydrant openings. If 785,500 square yards are cleaned in one day, requiring 1,000 hydrant openings, using 210 cubic feet of water per hydrant, this will require 210,000 cubic feet per day, or 267.3 cubic feet of water per 1,000 square yards cleaned. The total cost of water used per day for the cart patrol method, based on a cost of 6 cents per 100 cubic feet, is $126, or 16 cents per 1,000 square yards cleaned.

Sewer Cleaning.—Sewer cleaning is performed by what is known as a sewer gang. This gang consists of a foreman and two laborers. Their equipment is a light truck, shovels, hooks, and about 400 feet of hose. The method of cleaning catch-basins is to open up the catch-basin, remove the rock and refuse material and leave it on the street, where some time later a truck picks it up and carries it to the dumps. The smaller material may be flushed into the sewer by the use of the hose. One truck cannot keep all catch-basins open at all times, so the foreman of horse-drawn cart cleaning is charged with examining the catch-basins as the laborers go up and down the streets, and opening them if possible. The equipment consists of hooks and shovels, the cart gangs not being equipped with hose.

(*To be continued in the December issue*)

Sidewalk Which Stops at Street Intersection Is Incomplete

"PROTECT the man on foot and you will stop two-thirds of the motor accidents," suggests Edward S. Jordan, as a member of the Traffic Planning and Safety Committee of the National Automobile Chamber of Commerce, in a recent bulletin of that organization. It is estimated that 68 per cent of the fatal motor accidents during the first six months of 1926 were due to a vehicle striking a pedestrian. Suggesting remedies, Mr. Jordan says:

ADD CROSSWALKS TO SIDEWALKS

"Since sidewalks have been accepted for generations as a public necessity, it seems strange that we have been so slow in the adoption of crosswalks, which are of greater importance.

"The sidewalk is the engineering answer to the need of separating foot travel and vehicle travel.

"When you build a sidewalk which stops at the street intersection the job is incomplete, and in the age of motors it is less than half done.

"The trouble with our street system is that it is designed for the 1800's and is about as well suited to present demands as the leg-of-mutton sleeve or hour-glass figure.

"It is true that a crosswalk can not be built across a street satisfactorily at the same level. The most primitive step, of course, is to paint the foot crossings on the street pavement and this is being found helpful as a primitive measure.

"Overpasses or underpasses for the pedestrian are bound to come. It may be that, as many have predicted, most sidewalks will be on the second-story level with foot-bridges at street intersections. This is a practical possibility for large cities and some such development is bound to come soon.

"The fact is that remedies which do not bear directly upon the protection of the man on foot are of only secondary importance.

"Collisions between vehicles are only slightly more than 10 per cent of the total. Electric and railroad crossing accidents are frequent, and the rail lines deserve the greatest praise for their efforts toward reducing this type of disaster, but the number of these fatalities is negligible compared with the catastrophes due to striking persons on foot."

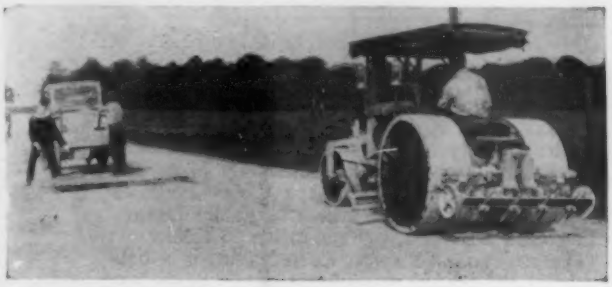
Among the various possibilities which Mr. Jordan suggests to help the situation (some of which are now being adopted in various quarters) are:

1. Painted crosswalks, usable by pedestrians only, when the traffic signal is with them
2. Education of adults and children on using care when crossing
3. Elevated sidewalks and foot bridges
4. Limiting turning of vehicles to specific streets instead of on every street

Ohio Finds Rolling of Resurfaced Road Worth While

The Experience in Richland County, Ohio, with Macadam Road Blanketed with Asphalt and Limestone Chips

THE Lincoln Highway for about fourteen miles west of Mansfield, Ohio, is macadam and has just been surface-treated with asphalt and limestone chips. The previous surfacing had been with .25-gallon of tar and 22½ pounds of stone to the square yard. From results secured then it was felt that the proportion of stone could be greatly increased to excellent advantage, preventing loss of asphalt oil and giving a better, more substantial surface. Greater losses of chips were, of course, expected, but these to a large extent would remain on the berm, making a better surface there.

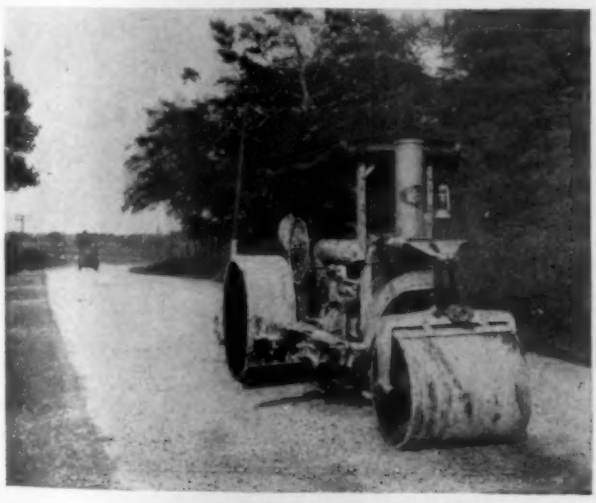


ROLLING THE CHIPS WITH A 7-TON ROLLER

The earlier plans did not include rolling, but when the short section in Crawford County was resurfaced, a 5-ton Galion Junior roller belonging to Crawford County was used to pack the surface, with such excellent results that arrangements were made to use this roller on the entire job. The quantities used were .25-gallon of asphalt oil and 28½ pounds of number 4 crushed limestone chips per square yard. Half the width of the road was surfaced at a time, leaving the rest of the road clear for traffic.

The chips were thoroughly rolled down with the Galion Junior 5-ton roller as soon as the placing of them was completed. Several distinct advantages resulted which satisfied the men in charge of the work that rolling is thoroughly worth-while. In spite of the big increase in the quantity of limestone chips, there is less loss when rolled, than with the smaller quantity unrolled. The ridge which usually occurs in the center when half the road is surfaced at a time, is entirely reduced by the roller, leaving an even surface. The surface of the road is left more even and firm, with far less shifting of chips, exposure of fresh asphalt oil and irregularities resulting from traffic than is the case with unrolled surfacing.

From the observation of the surface so far, it is safe to say that the excess of chips and the rolling have resulted in a much better and thicker surfacing and one which will be far more lasting and satisfactory than the previous surfacing, and that this and the other advantages that have been described above greatly outweigh the added cost of the larger quantity of limestone chips, and of the use of the roller.



WITH 20 PER CENT MORE CHIPS AND THE SAME AMOUNT OF TAR, ROLLING PRODUCED A MUCH BETTER ROAD

This work was done under the general supervision of State Distributor Superintendent John Dalton, who supplied the information given above, assisted in Richland County, where most of the work is located, by County Superintendent of Roads T. B. Finney, who is well pleased with the results obtained.

Forward Steps

Reported by Municipal Officials, Chamber of Commerce Executives and Others

A Worthy Center for the "Crown City"

PASADENA, CALIF.—Of classic, dignified design will be the City Hall of Pasadena now in course of erection. It occupies an entire city block and commands the chief site of the Civic Center as provided for in popular vote, the Public Library being completed first, the auditorum to follow.

The structure, three stories in height, is a hollow rectangle enclosing a large patio. Its outer dimensions are 351 x 238 feet. The exterior finish of the entire building, in keeping with the completed Library and the entire civic scheme, will be of buff cast stone, the roof of red Spanish tile. The dome will be of clay tile of fish-scale pattern. varying in size and color, true to the Mediterranean type.

While the building itself is severely simple in its lines, the tower is strikingly picturesque, distinctly Mediterranean in its architecture and finish. The grace and beauty of this tower are shown in the picture reproduced on the front cover of this issue. It presents a square with liberally cut corners between the fifth and sixth floors, and above that is circular in shape. The open portals or perforations on all its sides characterize it as a structure suited only to semi-tropical regions and therefore well adapted to the climate of Pasadena. The height of the upper floor is 108 feet above the street, and the floor of the dome, just below the lantern, 164 feet; elevations which provide fine space for sightseers, who may easily view the ocean forty miles away, with the Catalina Islands discernible on the southern horizon.

The floors of these upper levels will be of red tile or concrete treated with pigment to make them attractive areas for the placing of memorial tablets and statuary. As this city is the home of many famous artists and sculptors and is considered a true art center, this section of the building will be made notable within a few years.

The floor plans throughout carry the best ideas of modern civic buildings, with special effort made to coordinate the public utilities as much as possible. And it is planned with a wide vision of future needs as well as those of today.

A somewhat distinctive feature is the splendid patio, 250 by 138 feet, in which there will be the

ARCHITECT'S SKETCH FOR PASADENA'S NEW CITY HALL

The architects of the building, Bakewell and Brown, of San Francisco, submitted alternative designs for the central motif. The one reproduced on the front cover of this issue was chosen

highest class of landscaping, with winding walks, rare shrubs and trees, and a wealth of flowers the year around.

Placing the civic center has been an expensive proposition to this city of only some 75,000 inhabitants, for the desired site was already covered with large residences and commercial buildings. This block could be had only for the expenditure of over a million dollars; the Library has cost $580,000 more and the City Hall calls for $1,200,000. Already, however, the people feel that the expense will be justified. The "Crown City," famed for its lovely homes and luxurious hotels, must have a worthy center.

R. V. ORBISON,
City Manager.

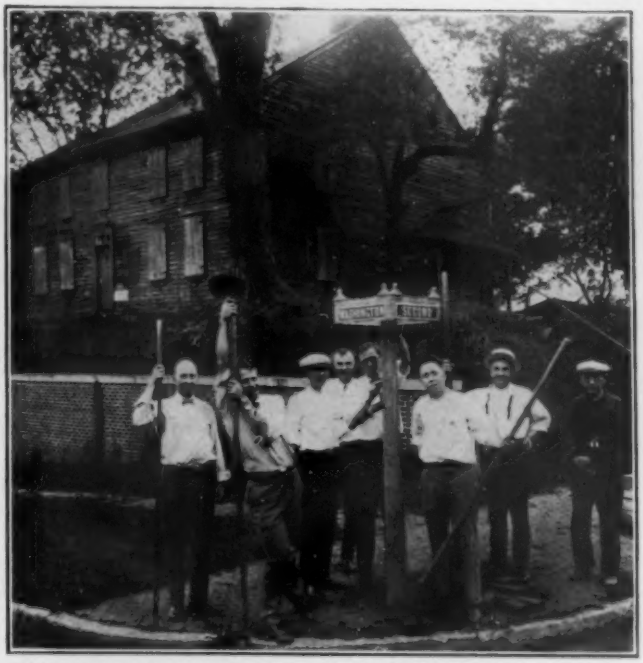
For an item on the civic center bond issue in Pasadena, see THE AMERICAN CITY for August, 1923, page 208.

Street Markers That Emphasize a City's Individuality

MARIETTA, OHIO.—Marietta is now equipped with 76 distinctly original and beautiful markers, presented to the city by the Marietta Kiwanis Club, and wholly significant of its individuality. The placing of the markers was done by members of the Marietta Kiwanis Club on the evening of August 10, with every man at his own special task. This work was the realization of one of the phases of a program for the beautification of Marietta as outlined in a campaign of the Club that had its inception about a year ago and that has held interest ever since. At the time of the opening of the campaign a committee was appointed to make a study of street markers, a study of traffic signals, and a study of directional markers for points of historic and civic interest.

On the day appointed for the work of placing the markers, the members of the Kiwanis Club were lined up in squads, with from three to six men in charge of the placing of the markers in each section of the city. The work of hauling the markers from the plant where they were assembled was done in the afternoon. Kiwanians assisted in loading and unloading. After careful tests for the best height for visibility, the posts were placed so that the center of the plate is barely 7 feet from the ground. The cooperative or "bee" method of installing the markers worked out very successfully.

The four-plate design of the marker, made by Hamilton A. Derr, is a replica, in bold relief, of Campus Martius, the fortification built at Marietta in 1788 by the men of the Ohio Company—the first organized settlement in the Northwest Territory. Charles Steadman, who for 44 years has been a pattern-maker in Marietta foundries, volunteered to make the pattern, which he did with a ¾-inch relief in the carving. The plates were made at the Marietta Casting Company plant, under the direction of Bert Steadman. The cement posts were made at the plant of the Marietta Cement Block Company from specially designed molds.



NEW STREET MARKERS AT THE LOCATION OF THE PIONEER STOCKADE, CAMPUS MARTIUS, IN MARIETTA, OHIO

The design of the marker is a replica of the fortification built in 1788. The building shown in the picture was the home of General Rufus Putnam, the only one remaining of those built within the walls of Campus Martius

The Marietta Paint and Color Company furnished the paint on the panels, and the Safe-Cabinet Company baked the enamel, which is Brewster green, with white letters and white border. The metal is cast aluminum, the design "pickled," a chemical action given for the effect of weathered wood.

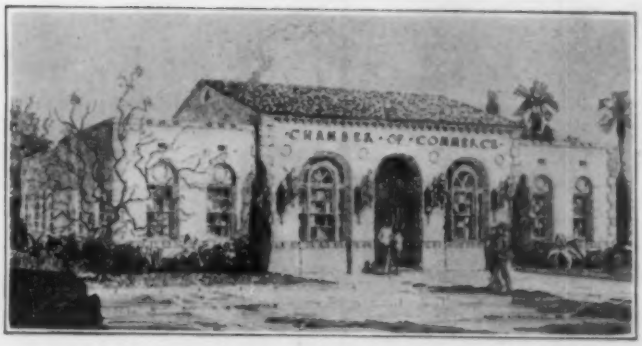
The object of the directional markers' campaign will be accomplished within the next few weeks, when 42 plaques of antique copper in two tones and with gold-leaf-covered letters, directing to historic shrines and spots of civic interest, will be placed at right angles from cross-arms on the street markers. All the plaques will be 16 inches wide and as long as the lettering requires.

R. E. THOMAS,
Formerly Managing Secretary, The Marietta Chamber of Commerce.

A Distinctive Chamber of Commerce Building

BROWNSVILLE, TEXAS.—The beautiful Spanish type building pictured on page 680, now under construction, will house the activities of the Brownsville Chamber of Commerce early in December. It will be owned by the Chamber and will be devoted entirely to community projects. The Brownsville Chamber is financed on the city board of development tax plan, and the building is to be paid for in monthly installments out of the fund available for chamber of commerce work.

Tile and stucco are the materials demanded by the type of architecture. Offices will be provided



NEW CHAMBER OF COMMERCE BUILDING, BROWNSVILLE, TEX.

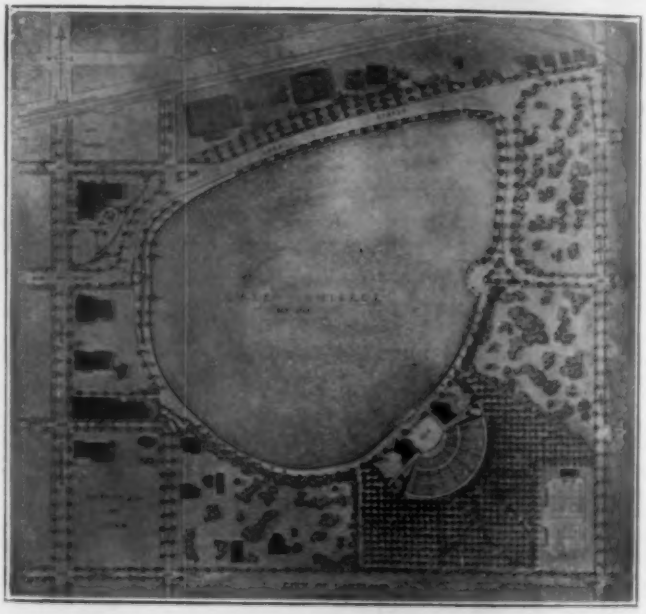
States deputy game warden, naturalist, and expert taxidermist.

The building will be surrounded by a public park, now being beautified with large palm trees, which have been transplanted to the site. Many large native trees are already growing there. The park will be used as a recreational center, with grounds for croquet and horseshoe pitching, with tables and benches under the trees, and other devices to provide entertainment for tourists and citizens.

G. C. RICHARDSON,
Manager, Chamber of Commerce.

for the Manager, his assistant, and two stenographers; for the publicity department, the traffic department, and the Lower Rio Grande Valley Automobile Club. There will be a lobby, 33 by 17 feet, an assembly room 19 by 41 feet, rest rooms for men and women, storage rooms and various closets. Two wings of the building extend back and form a patio, upon which a concrete porch opens through arches.

The assembly room is to be used for meetings of Chamber of Commerce members and other public gatherings, and will be provided with portable chairs. When it is not in use for conventions or other meetings, it will be equipped with reading and game tables and will serve as a recreational center for tourists. One end of this room will be lined with glass-enclosed cases, where will be displayed agricultural products and mounted specimens of the bird and animal life of this section. Many of the specimens have already been prepared by R. D. Camp, local United



Design by Charles Wellford Leavitt & Son

AIRPLANE VIEW PERSPECTIVE OF PLAN FOR CIVIC CENTER, LAKELAND, FLA.

Photographs by Jay Brown, Lakeland, Fla.

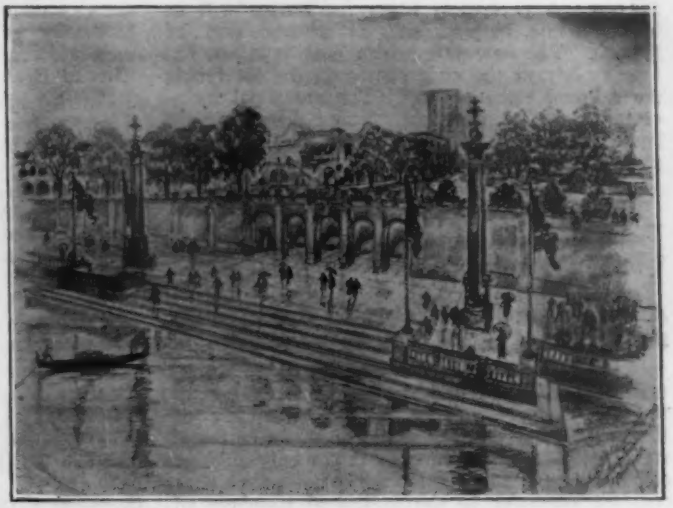
AIRPLANE VIEW OF LAKE MIRROR AND THE SURROUNDING BUILDINGS IN LAKELAND'S BUSINESS DISTRICT

A Civic Center Around a Lake

LAKELAND, FLA.—The accompanying photographs tell an interesting story of municipal development. On June 1, 1926, Lakeland voted $1,500,000 in bonds for various improvements, which included some $350,000 for the development of the civic center. On September 10 the dredging began in Lake Mirror, throwing up the shore line, shown in two of the illustrations.

Completion of the civic center development will take one or two years, and will represent a total investment of $750,000. A special bond issue for the municipal amphitheater will probably be voted early in the spring of 1927. This construction will be the outstanding feature of the work. The plan is shown in the photograph of the complete layout, and the view on this page shows how the amphitheater will look from across the lake. It will seat 5,000 people and will afford opportunity for remarkably fine effects of grouping, lights, and colors.

As the lake is approached from Main Street, a promenade will follow its shore, and the main East-West Coast highway will come around the lake from the opposite side. Space has been left directly across from the entrance on Main Street for the erection of a memorial monument. Shops and stores will line the promenade and will be backed up against the buildings shown in the actual photograph of the lake front as it is today.



PROPOSED ROTUNDA ENTRANCE TO CIVIC CENTER PROMENADE FROM MAIN STREET, LAKELAND

Besides the recreational features that are essentially a part of the plan, there will be courts for tennis, roque, and bowling on the green. The lake and its shores will be the center of the community life of Lakeland. (See views on opposite page.)

At this time have been completed the city auditorium, seating 2,000; municipal light and water plant improvements costing $800,000; a new city hall, $250,000; and a new City Courts building, housing the fire and police department headquarters, approximately $50,000. No other municipal buildings are to be constructed in the civic center project. The city is completing the library on the shore of Lake Morton. The municipal hospital on North Massachusetts Avenue was completed and opened a few months ago. The hospital cost $300,000 and the library

THE AMPHITHEATER IN LAKELAND, FROM ACROSS THE LAKE

Photographs by Jay Brown, Lakeland, from designs by Charles Wellford Leavitt & Son

$75,000. A permanent home for nurses will be built on the hospital site, at a total cost of $75,000. The new jail, which cost $150,000, has been built near the civic center on the lot facing the railroad right of way. The municipal incinerator and the municipal sewage disposal plant have already been provided for in the bond issues of 1924 and June, 1926.

IKE PARRISH,
Publicity Director, Lakeland Chamber of Commerce.

For a description of Lakeland's fire and police stations, see THE AMERICAN CITY for July, 1925, page 17.

A Calendar That Helps to Systematize the Work of City Councils

ELDORA, IOWA.—A municipal calendar, published under the title of "Guide to Municipal Officers of Iowa" by the Municipal Service Company of Eldora, is a booklet that would no doubt be found valuable by any city council. It not only aids the council in systematizing its work, but serves as a constant reminder to the individual members of the tasks which it is their duty to perform at specified times.

The first page of the calendar lists the duties that require attention every month in the year; then follows a separate page for each of the twelve months, on which are indicated the activities that should be under way during that month. Space is allowed in each case for memoranda of special duties required by local ordinance. Copies of the guide may be secured from the Municipal Service Company, Eldora, at $1.50 each, or $1.00 each for orders of five or more.

W. H. SOPER,
Mayor.

Stockton Upholds Its City Manager Administration

STOCKTON, CALIF.—At an election held on October 12, the citizens of Stockton definitely upheld the city manager form of government and enthusiastically endorsed the business administration now being maintained in this city by City Manager Charles E. Ashburner.

By city charter provision, the City Council of Stockton has full power to employ its city manager and to fix his salary. The salary of the present holder of that office is $20,000 a year. Recently, a small group of citizens who apparently still prefer the old political form of government, filed an initiative petition to amend the city charter to limit the salary of the City Manager to $10,000 a year. It has been proved, however, by a vote of two to one, that the opinion of this group on the city manager question is not shared by the community at large.

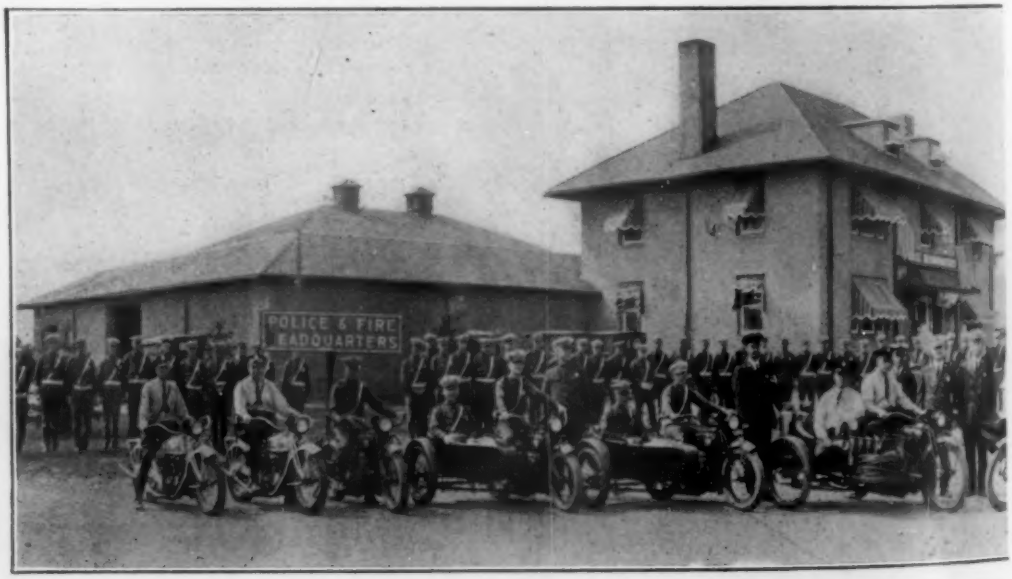
In commenting on the result of the election, the *Stockton Record*, in its issue of October 13, said editorially:

"We know now, and without any guesswork about it, that the people approve of the city manager form of government after having given it a three years' trial. We know now that the people are willing to leave problems of obtaining efficiency in government to the City Council. We know now that the people will not stand for tampering with the city charter or interfering with its fundamental principles."

A. S. DUDLEY,
Secretary, Stockton Chamber of Commerce.

Police and Fire Protection at the Philadelphia Sesquicentennial Exposition

The accompanying panoramic view, for which THE AMERICAN CITY is indebted to the Indian Motocycle Company, shows the headquarters and equipment of the Police and Fire Department of the Philadelphia Exposition. In the center of the picture is Director of Traffic George W. Fritz. At his right is Captain William Henne, and at his left Fire Chief Simler. The reproduction of the photograph of this large group is continued at the bottom of the opposite page.



POLICE AND FIRE HEADQUARTERS AND EQUIPMENT

Lawyers' Week in Spokane Increases Chamber Membership

SPOKANE, WASH.—The series of "Expansion Weeks" recently inaugurated by the Spokane Chamber of Commerce constitutes something new in the way of creating a better understanding of the Chamber among all classes of people in the community.

The initial effort to arouse interest in the first of the series, "Lawyers' Week," was made through a meeting at which several bankers entertained a group of lawyers, the Chairman addressing the guests on the activities of the Chamber and seeking their cooperation in reaching the other members of the legal profession in the city. Subsequently, after suitable publicity had been presented through the press and by direct mail, eight teams of two members each which had been formed among the lawyers present at the bankers' meeting, made personal calls on every lawyer in Spokane.

From the reports so far received, it seems certain that as a result of our first Expansion Week, the lawyer membership of the Chamber will be increased from sixty to at least seventy, and that the six or seven large law firms that are subscribers to the Chamber's sustaining fund will be signed up on a substantial basis for the coming year.

"Real Estate Week" is to be the next of the series, and the cooperation of the Realty Board of Spokane is already assured.

This method of handling membership promotion not only permits a much closer contact with the various groups of business and professional men than is possible in an intensive annual campaign, but also keeps the Chamber of Commerce in the public eye over a much longer period of the year.

JAMES A. FORD,
Secretary, Spokane Chamber of Commerce.

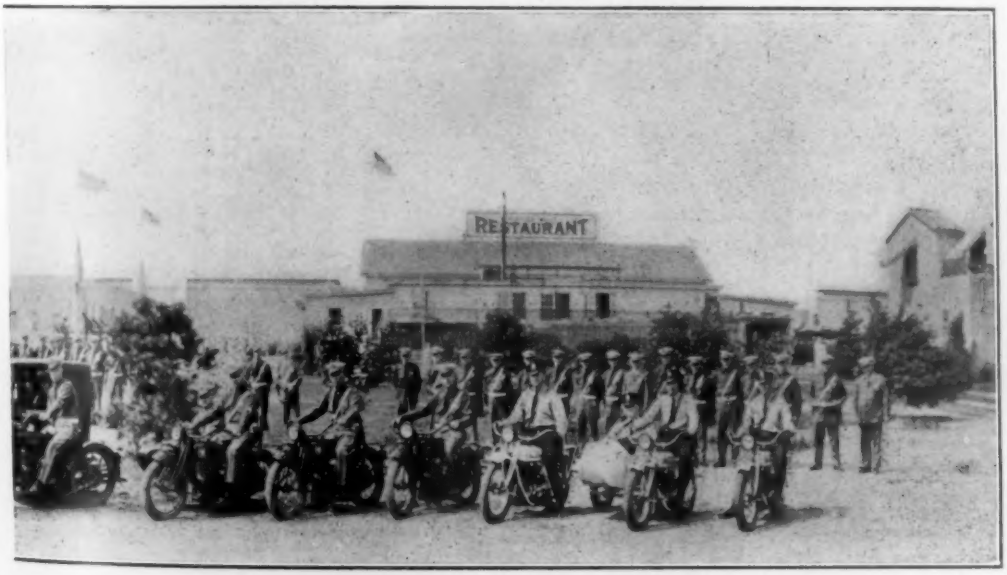
Timely Articles on Municipal Topics Offered to Newspapers

A NEW and distinctive syndicated service available for newspapers, in the form of timely letters on current municipal problems by Louis Brownlow, has been announced by Current News Features, Inc., 520 Star Building, Washington, D. C.

Fifteen years of successful newspaper work followed by twelve years in municipal administration, is the background which Brownlow brings to the newspapers he serves and which so ably fits him to offer interpretive facts on city functions. During his affiliation with municipal affairs, he has served as the chief executive officer of three cities—as President of the Board of Commissioners of Washington, D. C., 1917-1920; City Manager of Petersburg, Va., 1920-1923; City Manager of Knoxville, Tenn., 1924-1926.

The series of articles on municipal problems now made available in the new service, covers a list of 152 titles, each article serving as an introduction to the subject it treats, to be extended into detailed discussions as interest is manifested in the various questions. An indication of the broad scope of this material may be seen in such titles as "The Business of City Government," "Planning the City of the Future," "How to Pay for Present Service and Future Plans," "Protection of Life and Property," "The City and Its Public Works," "Water—the Life Blood of the City," "Street Railway Transportation," "The City and the Law," "Public Health Administration," "The City and the Public Schools," "The Town Child and Play," "The Public Library," and "The City and the Museum."

Through this service local newspapers can give their readers an intimate knowledge of the experience of other cities throughout the country, on which to base methods of handling similar problems in their own community. Full details can be secured upon application to Current News Features.



AT THE PHILADELPHIA SESQUICENTENNIAL EXPOSITION

Nine Years Without a Serious Injury to Children on Their Way to or from School

NEWARK, N. J.—A Newark motion picture theater was a court of honor recently when prizes for acts of heroism were awarded to nine members of the school safety patrols in the public and parochial schools of the city. The theater cooperated by giving a special performance to members of the patrols from all over the city. The meeting was preceded by a parade through Military Park, with music by the school safety patrol fife and drum corps and the Lafayette Street School band. Police Officer Felix Dunn, who is the godfather of the patrol, was marshal.

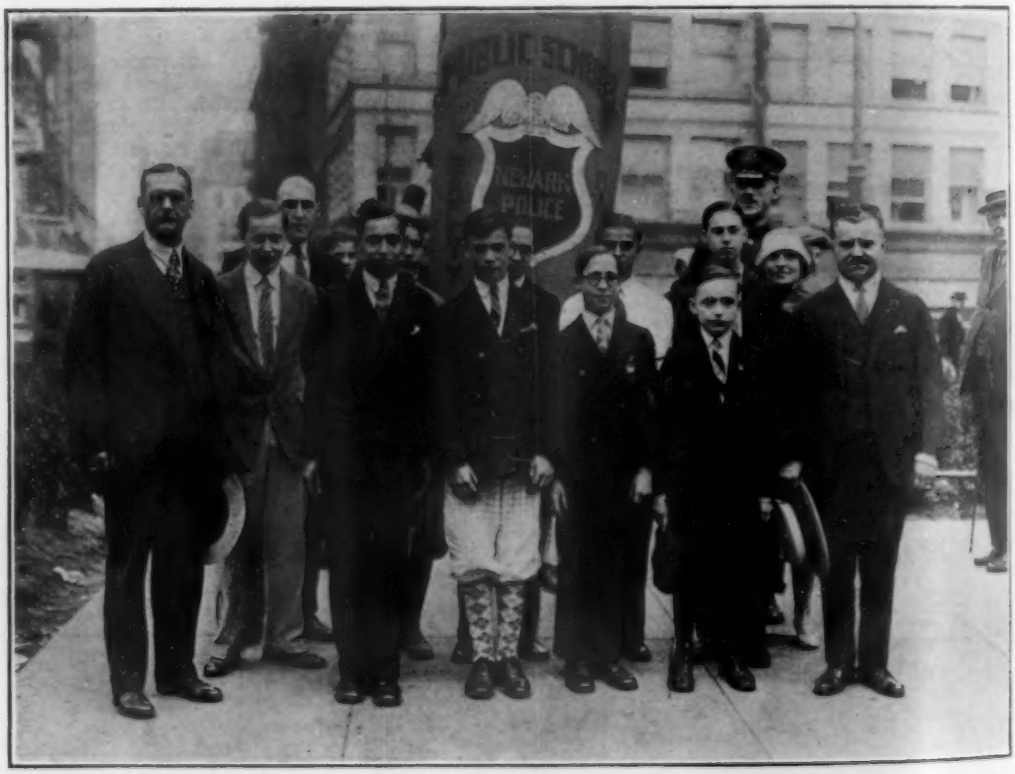
School boys' safety patrols in Newark have been in existence for nine years, during which time not a single serious injury has been suffered by school children on their way to or from school. In other words, the safety patrols have functioned effectively. Each year Officer Dunn investigates and compiles information about acts of heroism performed by members of the safety patrols. To those whose acts are judged to be the most meritorious, gold awards and other valuable prizes are given by a special committee consisting of Mr. Dunn and the Superintendent of Attendance of the School Board, the Chief of Police, the Director of Safety Education of the Public Service Corporation, the Superintendent of the Municipal Department of Combustibles, and the Manager of the Newark Safety Council.

This year the first prize was awarded to a boy who had rescued a small girl from the attack of a mad dog. The second award went to a boy who had rescued a playmate from drowning. Other prizes were awarded for the rescue of a man from a bonfire into which he had fallen; for pulling a small child from the path of an approaching fire-engine; for stopping a runaway horse which was approaching groups of children on their way to school; for rescuing a child from the path of a skidding automobile; and for pulling a child from in front of a rapidly moving truck.

Each year Officer Dunn is asked to report the school which has the best safety patrol of the eighty now organized in the city. To that school the Newark Safety Council presents a silver cup. This year the Safety Council award went to the Hawthorne Avenue School, of which Robert A. MacDonald is principal.

The school safety patrols are now definitely established in community safety work. Newark was among the first, if not actually the first, of the cities of the world to organize safety patrols among school children. Membership in the safety patrols is not limited to boys; many girls are doing effective work in safeguarding children on their way to and from school. In some places the safety patrol system is extended to cover playgrounds and summer schools, although usually they are organized only to serve during the regular school term.

FRED M. ROSSELAND,
Secretary-Manager, Newark Safety Council.



Photograph copyright, 1926, Newark Evening News

PRIZES FOR ACTS OF HEROISM WERE RECENTLY AWARDED TO THE NINE BOYS SHOWN IN THIS PICTURE, MEMBERS OF THE SCHOOL SAFETY PATROLS, NEWARK, N. J.

Drafting and Enforcing a Building Code
Part I

By Lent D. Upson
Director, Detroit Bureau of Governmental Research

IN their general principles, building codes of different cities do not vary greatly. Nevertheless, each city should draft its own code, formulating the details with reasonable regard for prevailing construction practices, availability of particular building materials, regulations of the fire underwriters and other similar national organizations, and the character of local prejudices. Such a code can be prepared best by a group of citizens selected for the purpose from the architectural and engineering professions, with proper representation of the authorities dealing with health, fire protection, and city planning. Advice should be solicited from the numerous trades affected, not forgetting the humble householder whose pocketbook, as well as safety, is involved.

The problem of building costs is by no means of least importance in the consideration of a proposed building code. To design buildings and equipment that will be fire- and accident-proof is solely an engineering matter. But it is not practicable for all people to live and work in fire- and accident-proof structures. For this reason, building regulations must be a compromise between what is technically desirable and what is practically possible, without unduly restricting home and industrial building. In this same connection, it must be remembered that trades and industries are not always unselfish in respect to the regulations urged by them. Electrical contractors and journeymen may ask in the name of safety for a restricted, and possibly impracticable, number of openings on each electric circuit; plumbing installations may be hedged about with restrictions that are in nowise necessary to public health[1]; the clay and steel products manufacturers will desire a maximum of fireproofing; asphalt-roofing producers will wrangle with the lumber interests in an effort, and perhaps a proper one, to outlaw wooden shingles; and, amidst all of these, and many other conflicts, the code writers must hold an even balance, with a keen eye to carefully disguised special privilege, formulating an ordinance that best serves the public.

A complete building code — or better, the several building codes —must be very detailed, covering restricted areas in which only fire-proof buildings may be erected, es-

From an Important Forthcoming Book

Through the courtesy of The Century Company and of the author, The American City has the privilege of publishing the accompanying statement of principles essential to success in drafting and enforcing a building code. This material comprises a portion of the chapter on Safety from Dr. Upson's forthcoming book, "The Practice of Municipal Administration."

In the introduction to the section here quoted the author points out that regulation of the construction of buildings and their appurtenances is a proper exercise of police power of the state, preventing the use of private property in a manner inimical to the welfare of the public; that certain general regulations are expressed in state statutes prescribing minimum building standards, but that local codes are necessary to cover details that are not or cannot be covered by general state law. Says Dr. Upson:

"Such a building code is simply an ordinance or number of ordinances, which because of effect upon the community are of special importance. Although the primary object of such codes is to prevent fires, protect persons and property from loss due to structural failures, and promote public health through abatement of unsanitary conditions, there is a decided indirect influence upon private property. The character of the code has a relation to the type of structures built, the use and value of land, the rate of insurance, the ownership of homes, and the interests of manufacturers of materials and of the skilled trades that utilize them."

The code outlined does not include the control of character and use of buildings except within the fire limits. These subjects are closely allied to safety and welfare, but come within the scope of a zoning ordinance rather than a building code, and are therefore treated by Dr. Upson in his chapter on City Planning.

[1] The Report for 1918, Division of Health Toledo, Ohio, quoting a health survey of the city made in 1916 by the United States Public Health Service, called attention to the injustice of the elaborate system required under the plumbing code, and submitted a simplified but entirely adequate system of plumbing for small houses.

pecially hazardous buildings, building materials, structural strength, fire-escapes and fire hazards in public and semi-public buildings, sanitation, electric equipment and wiring, heating and ventilating, steam plants and steam-actuated machinery, elevators, signs, billboards, and numerous other features. This means that a code must specify the qualitative arrangement of materials in buildings according to their height, size, and occupancy; qualitative and quantitative requirements as to materials; procedure to be observed in erecting and destroying buildings; and restrictions pertaining to projection into public ways. Because of varying conditions of climate, topography, industry, and available materials, it is doubtful whether a single uniform code applicable to cities of all classes can be drafted, although the so-called Hoover codes are an attempt in this direction, and a model code has been drafted by the National Board of Fire Underwriters.

Mr. Frank Burton is of the opinion that the greatest drawback of present building codes is not their lack of uniform requirements, but the difficulty of ascertaining the requirements in any particular case.[2] Construction requirements are so scattered through the ordinary code that it is necessary for an architect or engineer to review nearly every page in order to obtain all of the regulations pertaining to even a small, unimportant building, and practically to commit a code to memory before drawing an important plan. This difficulty is aggravated when effort is made to practice in a city with which a designer is not familiar. It has been suggested that the present difficulties with codes could be minimized, not through uniformity of requirements, but through uniformity in arrangement of subjects and of the requirements for each type of structure, so as to be readily accessible to the practicing architect without undue expenditure of energy.

From a code so arranged would be eliminated those provisions not directly related to building construction, since they usually affect particular trades, and an intimate knowledge of them, on the part of the architect, is not required; for example, elevator construction, electric wiring, plumbing, and boiler and heating requirements; and also those provisions applicable to certain classes of structures that are not buildings in the ordinary sense of the word; for example, roller coasters and similar amusement devices, and possibly grain elevators, coal pockets, and other engineering constructions.

Suggested Outline of Uniform Code

The code proper would contain subject matter arranged somewhat in the order of the following paragraphs.[1]

Administrative Organization

Every code should have an introductory chapter dealing with the methods of administration, procedure, enforcement, and penalty; and this is the best place in a code to insert the special provisions regarding the handling of dangerous buildings. It is particularly essential that the methods of enforcement should be effective and workable.

Definite and Descriptive Provisions

Immediately after a description of the administrative procedure, provision should be made for the definitions of such words as it may be necessary to use in an unusual fashion and for the definitions of all words which have no exact meaning according to ordinary standards. There is no object in including definitions of words which already are clearly and accurately defined in ordinary dictionaries, but the writer of a code should make sure that he is using words in their accepted sense, for wherever arguments come up in the interpretation of a code, the courts will refer to a dictionary and accept the meanings given, often in spite of the fact that the word is quite commonly used with somewhat different sense.

Fire Limits

In the laying out of fire limits, care should be taken that the boundaries are established for good reason and not as a matter of real estate promotion or politics. So long as the fire limits include those districts of the city where goods of great value are stored, or where factories and warehouses, whose loss would be a vital matter to the city, are located, such fire limits are valuable. Too often politicians seek to extend the fire limits into some districts or omit them from others, with the view to acquiring special privileges for certain property owners, and this often destroys the value of such limits. It is peculiarly necessary in regard to fire limits that the questions pertaining to rebuilding, altering, and adding to existing buildings be clearly stated and carefully thought out, as these questions give much more trouble than those relating to new buildings.

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[1] Building Code Recommended by the National Board of Fire Underwriters (4th ed. 1922). Typical sections of codes have been prepared by the Bureau of Standards of the U. S. Department of Commerce which are available for the guidance of cities, among them Recommended Minimum Requirements for Plumbing in Dwellings and Similar Buildings; Minimum Live Loads Allowable; and Recommended Minimum Requirements for Masonry Wall Construction.

[2] An able paper on "The Construction of a Building Code," by Frank Burton, Commissioner, Department of Buildings and Safety Engineering, Detroit, is published in Proceedings of the Ninth Annual Meeting of the Building Officials Conference (1923), pp. 31-39. A paper by the same author on "Some Legal Aspects of Building Codes and Their Enforcement" appears in the Proceedings of the same Conference (1924) pp. 95-103.

[1] Frank Burton, op. cit., p. 32 et. seq. These paragraphs are summarized from the paper mentioned, with modifications made with approval of the author. Much important material has been omitted, and the complete paper should be consulted by any one concerned in the preparation of a building code.

For a model code outline following a somewhat different order, see a paper by Dean C. C. Williams, Department of Civil Engineering, University of Illinois, before the Kansas School for Water-Works Superintendents, April, 1922, *Kansas Municipalities*, VIII (October, 1922).

Types of Construction

Types of construction may be designated by name or by number, and should include fireproof, mill, ordinary, and frame construction, and it may be wise to add some other types, as for example, pressed steel construction, if not classed as fireproof. It is important that the description of each type of construction should be as complete and systematic as possible, and the sections dealing with different types of construction should be arranged in an identical manner. Starting with walls and foundations, the code should proceed to partitions, stair and elevator enclosures, columns, floors, roofs, penthouses, spires, and other roof construction, bay windows, porches, cornices, etc., endeavoring to include every detail or element of a building which the ordinance is intended to govern. All through the discussion of types of construction the materials to be used should be specified as accurately as possible, and it is unwise to state that the materials will be subject to the approval of the department, unless it be impossible to make a more accurate statement and be just.

General Classification of Buildings

The next logical step is to establish the classification of buildings according to their occupancy, and this classification should be based upon similarity of requirements from a building-code standpoint. This is probably the most difficult feature in the arrangement of a systematic building code, and there will be a great diversity of opinion on this subject. It is suggested that, first, all buildings be divided into those occupied only during the daytime, and those occupied during both the daytime and the night, i.e., buildings containing sleeping-rooms. Then divide the first group as follows: (1) buildings in which the material factor is predominant and in which the human element of occupancy is secondary, as factories, warehouses, power-houses, and similar buildings, except those having some exceptionally high element of fire risk; (2) buildings of the same class, but having an element of exceptionally high fire risk, such as garages, paint shops, storage rooms for inflammable substances, dry cleaning establishments, rag shops, and possibly stables, since this class of buildings should be more severely restricted, and popular opinion now demands a high degree of fire protection for dumb animals; (3) buildings of a semi-public character in which the material element is important, but secondary to the human element, to include retail stores, offices, business colleges, and other buildings of this nature, and very small assembly halls and meeting-rooms; (4) buildings of a public nature, in which the human element only is to be considered, and in which the question of the material element, that is, the cost of construction, can be made entirely secondary—for example, here place public administration buildings, auditoriums, dance halls, lodge halls, churches, schools, and possibly minor theaters having no stages for movable scenery; (5) buildings used as major theaters with stages for movable scenery. By this arrangement it is possible to make increasingly severe requirements for each class of buildings, although certain special provisions must be made for those in class 2, especially as regards type of construction.

Classification of Multiple Dwellings

Buildings used for dwelling purposes should be grouped into two additional classes, one relating to multiple apartments, and one to single- and two-family dwellings. Multiple dwellings should be further classified into (1) dwellings of three or more apartments, hotels, boarding-houses, boarding-schools, dormitories, etc., with, say, about ten or more sleeping-rooms; ,2) hospitals, sanitariums, and similar buildings, housing persons who are partly disabled from sickness or other cause; and (3) jails, prisons, insane asylums and other buildings of detention, where the inmates are entirely helpless as regards escape. In each of these sub-classes the restrictions as to the type of construction should be increasingly more severe, so that while four-story apartment houses might properly be of ordinary construction, hospitals, beyond two stories, should be fireproof, and places of detention should be fully fireproof regardless of how small they may be.

Single- and Two-Family Dwellings

The class containing single- and two-family dwellings should contain all of those small dwelling-houses and dormitories having less than ten sleeping-rooms, and the requirements for this class of occupancy should be made very lenient.

Details of Construction

The code should devote an entire chapter to each class of buildings, and one section to each of the most important features. These sections should be so arranged that sections of the same number in each chapter would pertain to the same subject, regardless of the class of occupancy of the building. The sections in each chapter should be somewhat as follows: (1) type of construction, starting with the smallest and lowest buildings in the classification and stating what types of construction may be used, going progressively to the larger and larger buildings, eliminating one type of construction after another until only fireproof construction is left; (2) mixed occupancy, dealing with those restriction regarding mixed occupancy which will be necessary to make the code intelligent and workable; (3) exits, which vitally affect the layout and general arrangement of a building, and concerning which the present rules are often illogical and so burdensome as to be ridiculous in some cases and quite inadequate in others; (4) stair and elevator enclosures and other types of vertical openings through floors; (5) restrictions as to location on property and fire protection afforded by sidelines, court walls, etc.; (6) fire-walls and limitations of areas within fire-walls; (7) fire protection apparatus, including all of the requirements as to standpipes, sprinkler systems, and similar matters; (8) miscellaneous details of construction which the code governs, but which find no place in the systematic arrangement suggested; (9) exceptions to general restrictions; (10) retroactive provision; and (11) alterations of existing buildings to new use.

Other Elements of Construction

The remainder of the code may properly deal with (1) excavations and foundations; (2) masonry construction; (3) steel; (4) concrete; (5) timber; (6) street and alley encroachments; (7) the procedure in building operations, pertaining to obtaining and posting permits, construction of sidewalk covers, guards around excavations, the planking of steel frames, guarding elevator and stair wells during construction, and similar features important to the building construction superintendent; and (8) specifications as to details of

construction, containing the standards governing fire-doors, chimneys, moving-picture booths, etc.

Special Codes

The foregoing outlines make no mention of electrical wiring, boiler construction, and similar subjects. The inclusion of these subjects in the one general code has never been successful, and in some states is frowned upon by the courts on the grounds that the building code proper affects real property, while the regulation of wiring and boilers relates to the use of personal property. It is a more desirable procedure for a city to adopt the special codes proposed by the technical organizations wherever they have been tried out and found practical. The electrical code of the National Fire Protection Association is now standard under the procedure of the American Engineering Standards Committee. It has been adopted by nearly all important cities of the United States, and its adoption by local ordinance is much better than an attempt to draft local codes as parts of such local ordinances.[1] The boiler code of the American Society of Mechanical Engineers, known as the A.S.M.E. code, is now used in nearly all states of the Union except Massachusetts, and is far superior to any local code. The adoption of these national codes is desirable, not only because of the care with which they have been formulated, but because of the adverse effect of local codes upon the taxpayer. Electrical apparatus, boilers, etc., manufactured in one city, are used throughout the country. It would be difficult, as well as expensive, for citizens to purchase such equipment according to special order and design, instead of specifying the American standards applying.

[1] This code has been issued in some fifteen editions over a period of thirty years. To maintain the code abreast of the times, there is a permanent national committee representative of all interests concerned, and also an electrical field engineering service to assist municipalities and others in the use and necessary development of this code as the art rapidly advances.

EDITORIAL NOTE.—*The second part of this article, on the organization for enforcing the building code, will be published in an early issue of* THE AMERICAN CITY.

SPEAKING OF SKYSCRAPERS

A CARTOON FROM "BROOKLYN," THE WEEKLY BULLETIN OF THE CHAMBER OF COMMERCE OF BROOKLYN, N. Y.

New York Continues to Pile Up Trouble

Photograph by Fairchild Aerial Surveys, Inc.

NEW SKYSCRAPERS ARE CONSTANTLY ADDING TO THE TRAFFIC CONGESTION IN THE TIMES SQUARE DISTRICT AND ELSEWHERE IN NEW YORK CITY

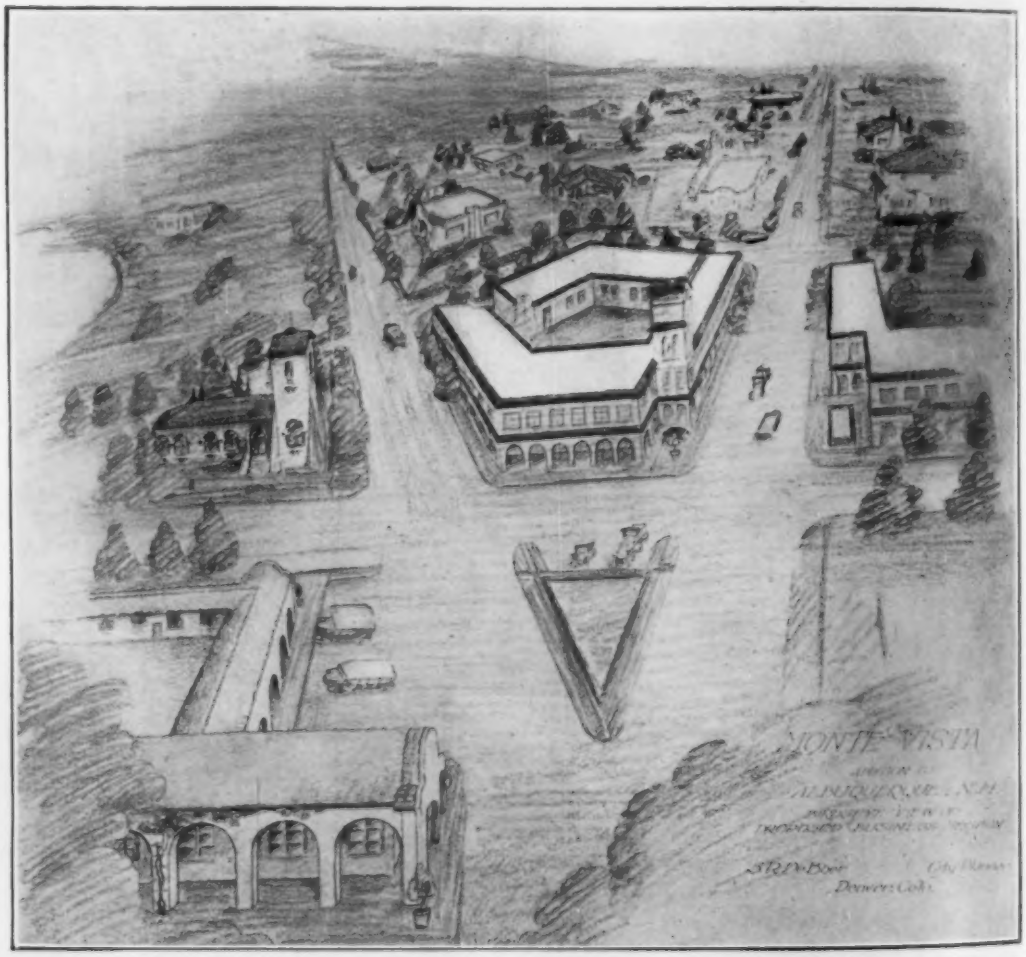
Transforming the Business Centers of Pioneer Western Towns

Exchanging Ugliness and Monotony for Attractive Individuality

By S. R. De Boer
City Planner, Denver, Colo.

IT is likely that at no time in the evolution of civilization has there been another movement to equal the settlement of the western plains of the American continent. Nowhere else have towns and cities been sowed broadcast over a thousand miles of plains as they were spread over the section between the Rockies and the Missouri River during the second half of the past century. That these cities, located in such a wholesale way, should be laid out according to a simple pattern, and all alike, should not astonish anyone. Even if city planning methods had been known in those days, there would have been no time to make use of them. And so today we find this vast section dotted with hundreds of towns and cities that, so far as their street system is concerned, might well have been rubber-stamped on the country.

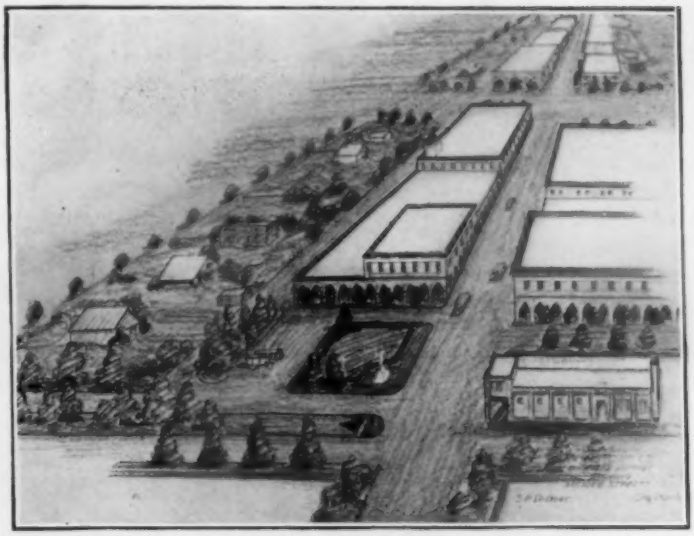
It was good fortune that most of these towns were located on fairly level ground, otherwise the system might have become fatal—as in



THE PROPOSED NEW BUSINESS CENTER FOR MONTE VISTA, THE RESIDENTIAL DISTRICT EAST OF ALBUQUERQUE, N. MEX.

fact it has shown itself to be in places where the rectangular lines hit streams, hills, lakes, or other natural obstructions. The first principle of civil engineering, that a structure must fit the topography, has been entirely overlooked in this wholesale platting of western towns.

The corner of Main Street and First Street being the same for City A as for City B, and so on, has given these cities a monotony and a lack of individuality that are not only a disadvantage from the standpoint of beauty, but an actual financial handicap. Business interests in several communities are beginning to realize this, and a number of developments are on the way for more attractive business districts. The value of these centers will be permanent community advertising. A business district that has distinction enough to attract attention will act as a standing advertisement for all the business houses in it.



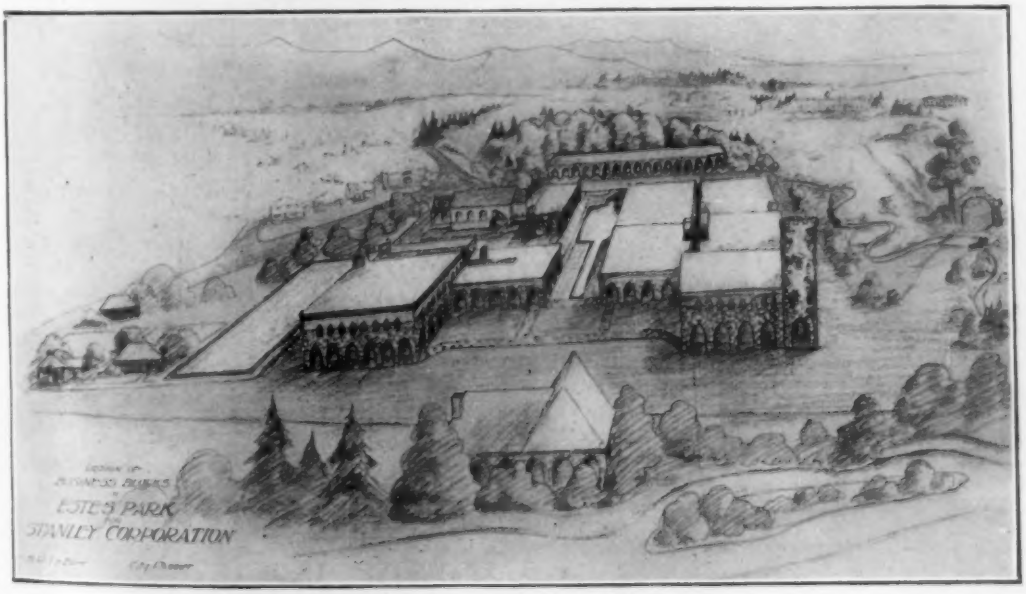
PLAN FOR BUSINESS DISTRICT OF JOHNSTOWN, COLO.

Albuquerque, N. Mex.

The proposed new business center in the residential district east of Albuquerque, N. Mex., is of Spanish type. The stores are grouped around an open square formed by the meeting point of five major streets, with a simple little park in the center. The buildings have arcaded sidewalks and are placed so as to allow ample parking space away from the line of moving traffic and to secure the greatest advertising value. On one corner a church of mission character is proposed. The whole plan is of sufficient size to allow for development, and large office buildings can be fronted on the square if they should become necessary at any time.

Johnstown, Colo.

The business district of Johnstown, Colo., is also a remodeling of an existing town. The main street being too narrow for the increas-



THE PROPOSED BUSINESS DEVELOPMENT OF ESTES PARK, COLO.

ing traffic, it is proposed to put the curb on the property line and put the sidewalks on private property, under the store buildings; in other words, to arcade the sidewalks. A small park is worked into this plan, to be used as a civic center and for additional auto parking area. The whole scheme will be developed in brick and in Gothic style.

Johnstown is the center of a large agricultural district, and it is expected that this method of permanent community advertising will materially benefit the town.

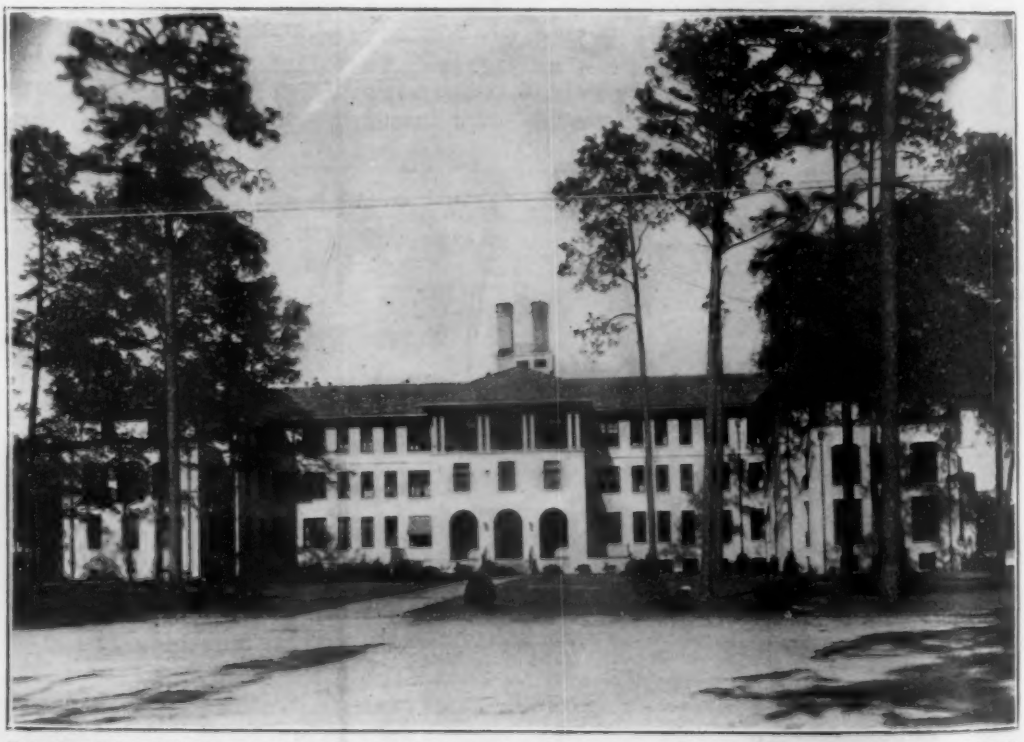
Estes Park, Colo.

The proposed business development of Estes Park is of a different character. Estes Park is the business center of the Rocky Mountain National Park and a summer resort town of importance. In spite of this, the town itself is not only unattractive, but positively ugly. The surrounding district is probably one of the grandest in the world for natural beauty, but the town itself is still an old, overgrown pioneer village. The company promoting this new addition has large interests around the town and it has conceived the idea of making several blocks of business buildings so attractive that they will form a guide for further development.

The plan is based on a series of Gothic business blocks, with Gothic arcaded streets, more or less on the order of cloisters. A little stream running through the property is partly diverted into an ornamental pool, where trout are to be grown. The existing auditorium is made part of the group. A river frontage park is to be laid out at the entrance. These business blocks are located at the entrance to the town, and the first view strikes a small Gothic tower.

All the stores are grouped around open Gothic squares, somewhat like the Oxford colleges. A string of curio stores is placed against the cliffs back of the town, and little streams of water trickle over the rocky background into small pools at its base. The main grouping is tied to the park ground, which will be developed with these business blocks.

Archbold Memorial Hospital, Thomasville, Ga.



This hospital, which is one of the best-equipped in the South, was erected, equipped and endowed by John F. Archbold, of New York City, as a memorial to his father, John D. Archbold, at a cost of more than $1,000,000. Mr. Archbold, who has a winter home at Thomasville, Ga., turned the hospital over to the city and county

City Planning and Zoning Aided by the Florida Hurricane

Fort Lauderdale's Official Plan, Previously Approved by the Electorate, Is Guiding the Reconstruction and Future Development of That City

By Robert M. Kerr

Member City Planning Committee, Fort Lauderdale Chamber of Commerce

SO far as city planning and zoning are concerned, Fort Lauderdale, Fla., will profit by the disaster of September 17 and 18. The storm emphasized to the people the need of building wisely for permanency, and in accordance with modern standards, not only for business and residence structures but also for public works.

Fortunately, on June 22, 1926, the city had taken steps to fulfill its ambition to build wisely and in harmony with modern standards. At a special election on that day Fort Lauderdale accepted a comprehensive city plan by vote of the electorate—the first Florida city, so far as we know, which has done so in this manner, although many Florida cities have either adopted city plans through their legislative bodies or are now preparing them. The vote was emphatic—practically a six to one favorable majority. Shortly thereafter the City Council passed a zoning ordinance.

Fort Lauderdale, a sleepy outpost in 1910, an awakening village of 2,065 people in 1920, a thriving, active, fast-growing city of from 15,000 to 18,000 people in 1926, had need of a city plan and a zoning ordinance. A city manager charter, in effect but a short time, provided for the appointment of a City Planning Board and Zoning Commission. This group, appointed late in 1925, composed of capable citizens, employed Richard Schermerhorn, Jr., city planning consultant, of New York City, to have charge of the detail work and to advise on the city plan and the zoning ordinance under the Planning Board's supervision. The city plan and the zoning ordinance prepared by Mr. Schermerhorn were the ones adopted by the city.

Carrying out the city plan by the municipality is made mandatory by the charter. The only changes permitted are by a vote of the people. The time of execution, of course, depends on the needs and resources of the municipality. Definite assurance is given, however, that when improvements are made, they will be in an orderly and systematic manner.

Five Questions on the Ballot

When the vote on the plan was taken, five separate questions on the ballot enabled voters to express judgment on the entire plan or any of its parts. A brief summary of these, in order of their popularity, follows:

1. *The proposed street widenings and extensions in the old main sections of the city*

This established standard street sections. The zoning ordinance, effective July 26, establishes setback lines from these street sections. Therefore, new structures cannot be built in such a position that they would later have to be demolished or moved when the street is widened. As the city widens streets in the old section of town, vacant property may be acquired, as it is now being acquired in many cases by quitclaim deeds. The city's policy for acquiring the property, in case a quitclaim deed is refused, has not been decided. Already the city is going forward with a modest street-widening program. For one main highway widening of over five miles through the city, quitclaim deeds to 95 per cent of the property necessary for the widening have been given. The only parcels that are being condemned are those where nearly half of the lot is taken.*

2. *Beautification of river drives in the central part of the city*

North and south new river drives in the heart of the city will have an artistic system of landscaping, together with modern bulkhead construction.

3. *Main arterial thoroughfares and secondary streets*

The necessity for this feature had arisen because of the remarkable recent growth of the city; the resulting inadequacy of the original street system; the rapid development and annexation of outlying territory; the inadequate number of streets that had so far been widened; and the discrepancies in surveying data that caused jogs and uneven street continuations. Most of the new thoroughfares proposed are diagonals traversing unplatted, vacant acreage. Many of them will not need to be established for years.

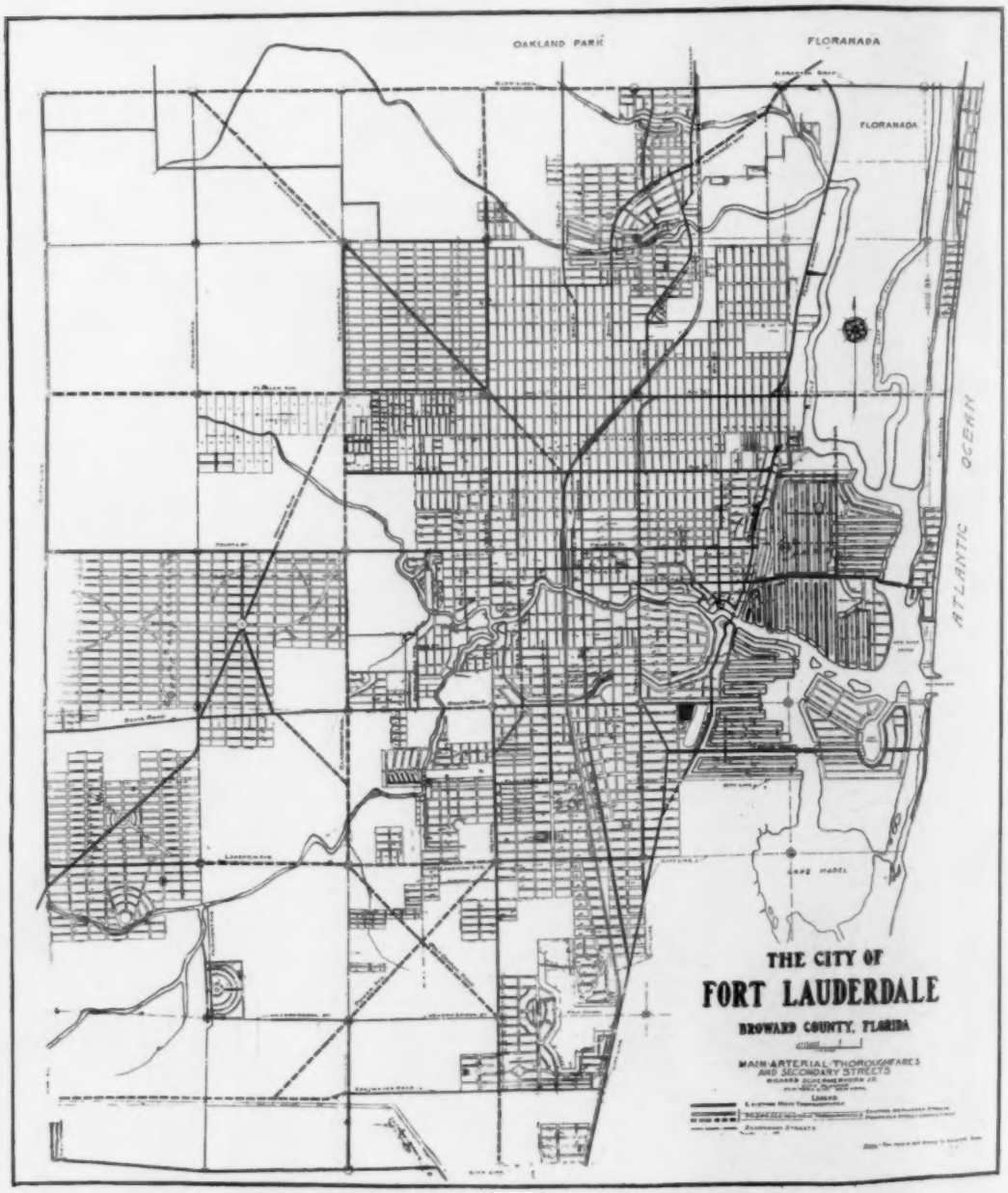
*Buildings damaged or destroyed in the storm, that formerly projected beyond the new setback lines, are being compelled to recognize these lines when repairs or rebuilding is contemplated. As an illustration of this, the "Vote for The City Plan" pamphlet issued by our Chamber of Commerce last June showed a picture with the caption, "Standard Building Lines Would Prohibit Building Jogs in the Future." The building in the picture that "jogged" the most was seriously damaged. It was immediately condemned. The City Council ordered plans drawn for its repairs or reconstruction in conformity with the standard building line.

The jurisdiction of the Planning Board over plats is believed to be sufficient to enable the Board to refuse to accept a plan for a real estate subdivision which would interfere with the subsequent construction of the proposed diagonal thoroughfares. Plats must be approved by the City Council before they can be filed and before subdivided property can be sold or laid out with the intention of sale. Prior to acceptance, therefore, each plat is compared by the City Planning Board and the City Engineer with the city plan maps and provisions—which are as much a part of the municipal law of Fort Lauderdale as the charter itself, having been adopted by referendum vote. If the plat does not conform, it is rejected or made to conform by the developer.

The Engineering Society of Broward County was active in supporting the city plan. One of the reasons for its support was that the plan would assist a subdivider in laying out his streets in accordance with the city street system. Some of the main arterial highways must traverse property already platted and in some cases built up. However, this is mostly through low-priced property and, when needed, can be obtained through condemnation at a reasonable cost to the City.

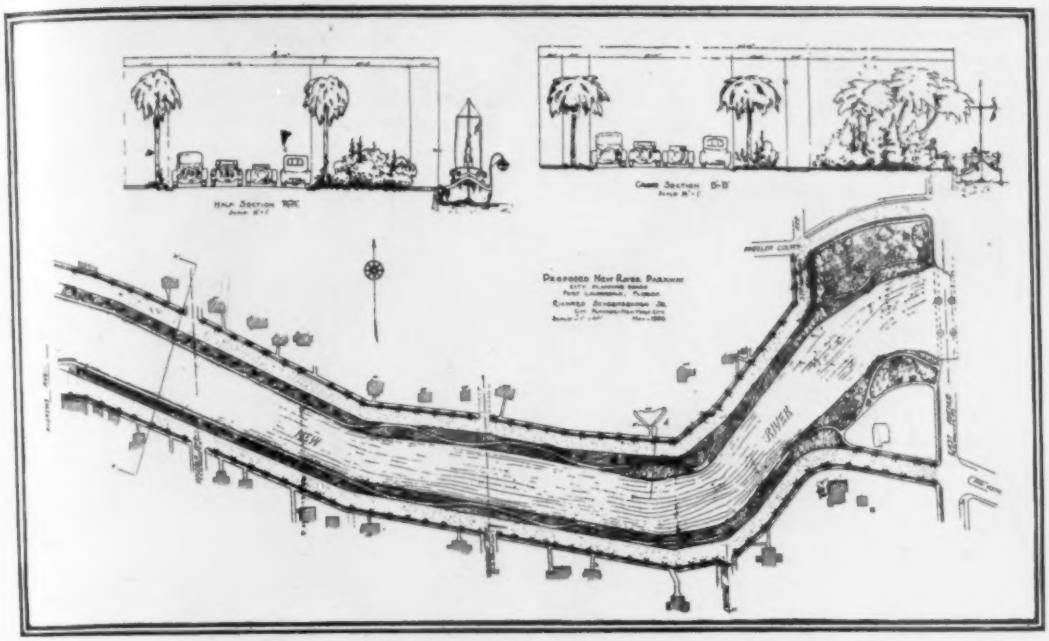
4. *The proposed civic center*

The central location of the high school, athletic



MAP OF FORT LAUDERDALE, PREPARED BY RICHARD SCHERMERHORN, Jr., SHOWING IMPROVEMENTS IN THE STREET PLAN

Solid lines indicate existing main thoroughfares; broken lines, proposed new streets



PLAN OF PROPOSED NEW RIVER PARKWAY FOR FORT LAUDERDALE

The river promenade is formal in character where it adjoins the business center of the city, and changes to a winding walk through picturesque plantations of trees and shrubbery as it continues toward the east, terminating in a public park at the site of the new East Avenue bridge

Reproductions from plans by Richard Schermerhorn, Jr.

THIS FORMAL TREATMENT OF THE RIVER FRONT IN FORT LAUDERDALE WILL PROVIDE CONVENIENT FACILITIES FOR YACHT DOCKAGE NEAR THE BUSINESS CENTER

field, and certain public buildings, together with surrounding areas not extensively built up, suggested the civic center which was incorporated in the city plan. The monumental buildings proposed were not as costly as is the case in many civic centers, and each building is surrounded by sufficient landscaped open space to make the civic center a truly worthy feature.

5. *Park, parkway, and recreational plan*

This is an outline. It is hoped to acquire at reasonable cost the property necessary to carry out this plan in advance of development. The plan proposes to take advantage of Fort Lauderdale's natural beauties and to protect them from the destruction that undirected city growth and development often causes.

Other recommendations included in the city planning consultant's report to the City Planning Board, yet to be worked out in detail, include: suggested plans for location of industries; recommendations concerning railroad and water transportation; yacht dockage; down-town parking, new railroad stations; and crossing separations.

How the Chamber of Commerce Helped

About two weeks previous to the date of the city plan election, the usual apathy of the voter on an academic question was apparent. Realizing that the adoption of the city plan was one of the biggest questions with which the Fort Lauderdale Chamber of Commerce could be concerned, this group prepared an illustrated pamphlet which was sent to registered voters and others. This was followed by an extensive publicity campaign. Exhibits were maintained at the City Hall. On election day a "Get out the Vote" committee worked during polling hours.

The success of these efforts is attested by the huge majority in favor of the city plan. It illustrates again that in so far as the public is informed on worth-while questions, it can be relied on to do its share at the polls.

The storm could not destroy the city plan nor the zoning ordinance. These measures will be followed even closer since the storm, although some of the improvements of an artistic nature that were contemplated under the city plan will now be delayed because of the great amount that was spent for relief work and that will be required for more necessary public works.

Local and Municipal Self-Government in India

IN British India there are 750 municipalities, 1,500 district and subdistrict boards, and about 12,000 village Panchayats, or local councils of five persons, for investigating violations of caste. The *All India Local & Municipal Self-Government Gazette*, published in George Town, Madras, deals with all topics relating to these governmental units. The aim of this publication, as given on the cover of each issue, is:

"A life free from anxiety for daily bread,
A life free from premature death and decay,
A life free from ignorance,
And a simple life for all."

Recent issues of the magazine contain articles on health, housing, hydroelectric works, waterworks, recreation, and public officials. In the July number, an analysis of the Bombay Corporation Commissioner's Report is introduced by this paragraph:

Playgrounds in City and Municipal Areas

"We have been drawing the attention of our readers to the necessity of making adequate provision for a sufficient number of well equipped recreation grounds in Municipal areas. We are now able to place before our readers as to what Bombay has done in this direction and it is interesting study to see what limitations are naturally imposed upon such developments. We wish that other cities also are able to show such activity and substantial work. But we cannot agree with the Bombay corporation that they cannot attempt to provide grounds in the heart of the city, basing cost as an impediment. Of course, easy means of communication may help adults and grown-up boys. But the small children deserve to be taken care of as much as any others and as such, even though spacious lawns and parks may not be laid out, still enough provision must always be made at any cost for the enjoyment and recreation of urchins and small children, wherever necessary, either attached to schools or even independently, as is done in Western Countries—"

These are sound principles, whose application might well become more general throughout the world. Such a statement stimulates the interest of Western readers in the work of this enterprising civic periodical.

The Chicago Business Center and the Subway Question

IN the September number of this magazine, under the heading of "Raised Sidewalks and Traffic Separation Urged for Chicago," excerpts were published from a recent pamphlet by Edward H. Bennett, Consultant of the Chicago Plan Commission. The quotations selected, as indicated by the heading, related particularly to Mr. Bennett's proposals for the removal of pedestrians to an upper level, and the abolishing, at certain intersections in the Loop, of grade crossings for vehicular traffic.

In a letter dated October 5, Mr. Bennett expresses fear that readers of the September article will assume that he is wholly opposed to subways. He explains that it was his intention, first of all, to question the necessity of subways, and, secondly, to demonstrate that without collateral city planning improvements in Chicago the subways could not be really useful.

Readers interested in traffic relief can obtain a copy of Mr. Bennett's pamphlet on application to him at 80 East Jackson Boulevard, Chicago.

Eight Killed When Bus Driver Misinterpreted Signals at Grade Crossing

P & A Photos

It was pouring rain on October 1 when this auto stage-coach, with twelve passengers, reached a grade crossing near Dixon, Calif. The fast Southern Pacific Overland Limited was due, and the bus driver misunderstood the signals of the watchman at the crossing and attempted to cross the tracks. The lower picture shows all that was left of the stage after the crash. The upper picture was taken at the crossing soon after the accident occurred

Roadsters, Motorcycles and Traffic Lights Modernize Police Department

By C. O. Sherrill
City Manager, Cincinnati, Ohio

FOR the last few years the paramount idea in the minds of all business people has been speed. On rapidity of transportation is built the commerce of the world. We started by foot, then took to the horse. then to the automobile, and the future leans more and more to the use of airplanes—always more rapid transportation, greater speed in getting from one place to another. This, of course, is not only true of business, but it is also quite true in all walks of life and even in municipal government.

There were days in Cincinnati when the patrolman could mount "Old Dobbin" and cover his beat very quickly, easily, and efficiently, but that day has passed. With the rapid and extensive growth of Cincinnati came the need for more mobile means of getting to its far corners and of covering its fast-growing suburbs.

Upon my arrival in Cincinnati in January of this year there were still a few horses left in the service of this city's police force. As they were unable to cope with the situation and furnish that means of transportation necessary to the present-day city, there was but one thing left to do—put aside sentiment and put into operation small roadsters and motorcycles. It is true that people become very much attached to a horse, the same as they do to a dog, and that was exceptionally true of the patrolmen of this city. Most of them thought more of their mounts than they could ever think of any other means of transportation that could be furnished them. This made the problem a little hard. Still, the horse had to go, or else the problem of the police force could never be properly handled.

At present, Cincinnati has its Police Department divided into nine districts and operates in all of these about eighty roadsters. One patrolman to a car can cover about eight miles of street an hour and still see all that is going on. In addition to the eighty roadsters, the city has five motorcycles, which are continually used on speeding.

"Checkerboard" System of Traffic Lights Adopted

On February 22 of this year, the new traffic lights went into effect in the congested area in Cincinnati—the area bounded by Central Avenue on the west, Ninth Street on the north, Broadway on the east, and Fourth Street on the south. There are in all 274 lights, four to a corner. When the system was started in this

FOURTH STREET, CINCINNATI—TRAFFIC ONE WAY, WEST
The lights are such that traffic is stopped on Vine Street and is now moving on Fourth Street

INTERSECTION AT FOUNTAIN SQUARE, CINCINNATI, WHEN AMBER SIGNAL IS ON AND ONLY PEDESTRIAN TRAFFIC IS MOVING

district, the timing of the signals was 35 seconds on the red and green and 6 seconds on the amber; later, the time was changed to 40 seconds on the red and green, with lights showing the same color in groups of two blocks each. Finally, in May, a change was made to a complete checkerboard arrangement, each intersection alternately red, green, red, with 20-second intervals for red and green and 6 seconds for the amber. This last change has greatly facilitated the movement of traffic and has also reduced the waiting of the pedestrians, who proceed on the amber and green lights only, with wonderful self-discipline.

It is truly surprising to see how fast the pedestrians picked up these regulations; indeed, the cooperation given us by them has been nothing short of marvelous. On the Arterial Highway crossings, where traffic is very heavy and approximately equal in both directions, lights are used to good advantage, but where traffic, although approximately equal, is not sufficient for lights, "Stop" signs on all four corners have proved very successful; these are also used where heavy traffic is in one street with light traffic on the cross-street.

We must admit that our system of traffic control is still new and probably needs some minor changes, but it has the general public approval and has greatly reduced traffic congestion. It has also strengthened our altogether inadequate police force, which is now more than 25 per cent under its normal quota, by relieving a great many traffic officers and allowing these men to be used for patrol duty. Where we once had approximately 100 men on traffic duty, we now have about 40; and as the people become more accustomed to the lights, we can reduce this number to 24 and probably to an even smaller number. This, of course, is a very great saving and an advantage otherwise, as the outlying districts need more men today; but on account of our stressed financial condition, we are unable to place more men on the force.

So all in all, between our new traffic lights and the use of all roadsters and motorcycles, we have greatly increased, not only the efficiency of our police force, but also the apparent number of patrolmen on the beats.

We shall not stop here, but in the not distant future a general reorganization will be made which will gradually reduce the police overhead and give us, with our present appropriation, money enough to increase the patrolman personnel actually on police duty, so that Cincinnati will have not only an efficient but a most adequate police force.

Traffic Control on State Highways of Minnesota

RULES governing traffic control devices on state highways within cities and villages of Minnesota were quoted on page 563 of this magazine last month. Through error, Michigan, and not Minnesota, was mentioned in the article. Readers who preserve their copies of THE AMERICAN CITY for reference purposes are requested to make the necessary corrections in the heading and also in the fifth line of the above-mentioned article.

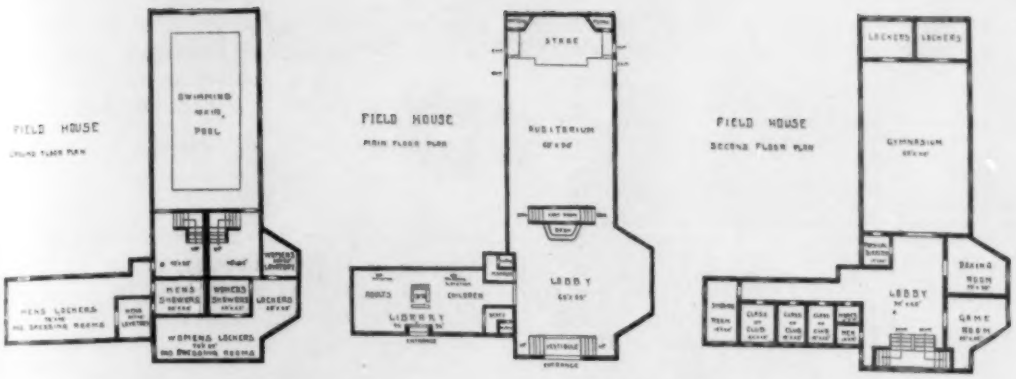
New Public Buildings for Baltimore

THE MUSEUM OF ART

Near Johns Hopkins University will be erected Baltimore's new Museum of Art, on a site to be chosen by the architect, John Russell Pope, of New York, and Henry Vincent Hubbard, landscape architect, of Cambridge, Mass. The structure will be 100 by 200 feet, and, while complete in appearance, may be doubled or tripled in size without lack of harmony.

The Municipal Office Building will house the overflow of public offices and will be connected with the City Hall by a tunnel. The architect is William H. Emory, of Baltimore. The building will be about 208 by 148 feet, eleven stories high, with a superstructure containing laboratories. The basement will be used as a city garage. Both buildings will be completed in 1927.

THE MUNICIPAL OFFICE BUILDING



Branch Libraries in Field Houses

A PHASE of library work offering great possibilities for usefulness, which appears to have been largely ignored both by libraries and by recreational agencies, is the establishment of branch libraries in field houses. As there has heretofore been almost nothing in print on this subject, the St. Louis Public Library has rendered an important service in the publication of a special bulletin, "Branch Libraries in Field Houses." From this bulletin, edited and compiled by Ruth Robi, Librarian of the Sherman Park Branch, the following paragraphs are quoted:

The Field House and Its Activities

"A field house is a community house used throughout the year. It is situated in a park or playground where there are baseball diamonds, tennis courts, play fields, a playground with apparatus for smaller children, and, in some cases, golf courses, wading and swimming pools, and children's gardens. In the field house itself are usually found a gymnasium, a swimming pool, and rooms where the activities of the center are carried on. These activities in a large field house include folk-dancing, music and singing, weaving and other hand work, sewing classes, pageants and amateur theatricals, social dances, parties and neighborhood gatherings, boxing, wrestling, basketball, and classes and clubs of various kinds. In some cases there is a cafeteria or refectory in the basement.

Cities Having Branch Libraries in Field Houses

"Data are presented from fifteen American cities where the public library maintains branch service of some kind in connection with recreation centers. These are: Berkeley, Calif., Chicago, Cincinnati, Denver, Detroit, Flint, Mich., Los Angeles, Milwaukee, Minneapolis, Nashville, Sacramento, St. Louis, St. Paul, Salt Lake City, South Manchester, Conn.

"Of these, there are only five where a real branch of the public library, not a sub-branch or a station, is operated in what is known as a field house. These cities are Chicago, Cincinnati, Flint, Minneapolis, and St. Louis. Only the Chicago and St. Louis branches are open full time; that is, from 9 A. M. to 9 P. M. Incidentally, these are in the largest and most complete field houses, and the branch libraries are operated on a larger scale than the others."

Reports from these fifteen cities are followed by a discussion of the problems of planning rooms in field houses for library use; cooperation between the library and the city authorities; discipline; advantages and disadvantages of libraries in field houses; and these general conclusions:

Conclusions

"One can see, by a careful perusal of the foregoing, that different libraries, traveling the same route, may arrive at diametrically opposite conclusions; to wit: that a branch in a rented store is far preferable to a branch in a field house, and that a branch in a field house is far preferable to a branch in a rented store; that discipline in a field house branch is far more of a problem than discipline in a regular branch library, and that discipline in a field house is no worse than discipline in any other branch library; that a branch library in a field house is preferable to one in a school building, and that a branch in a school building is preferable to one in a field house. Chicago reports that these branches are hardly used by the field house staff, while in St. Louis the branch is much used by the staff.

"We are forced to admit that local conditions are responsible for these diverse conclusions. All, however, seem agreed that life in a field house branch is not as agreeable and pleasant for the library assistants as it is when they are housed in their own building. This latter consideration raises the question of whether the library should be more concerned with its own comfort than it should be with rendering service to those taxpayers who would otherwise be without convenient library service. As Mr. Bailey of the Flint Public Library says 'Generally speaking, it is better to reach all the people somewhat inadequately than a few adequately.' Surely all statistics show a large circulation for these branches, in proportion to their size, except in those cases where the field houses are in sparsely settled districts. But any branch so located would necessarily have a small

issue, and the fact alone that the branch is housed in a community center is not responsible for its small use. As Miss Toomey rightly says:

"'As it is often inertia that keeps people from reading, the branch library in a field house offers an exceptional opportunity to encourage reading as a recreation. Many who come to the field house wishing to employ leisure hours, discover the existence of a library and are tempted to read.

"'A class of people who ordinarily find their amusement at picture shows and dance halls look upon the library as an educational institution, designed for children, students and the highly educated, but not for themselves. Because the need for intellectual interest in their lives is unfelt, they might never be induced to take the trouble to come to a library if some other attraction did not bring them there.'"

Books and Articles on Community Houses

An important feature of the bulletin is an annotated bibliography, compiled by Florence Jennings Crutcher, on community and social centers. This list, containing 124 entries, is classified under the following headings:

General Discussion	Community Buildings as War Memorials
Surveys	Community Centers
Organization	
Community Buildings	

Proposed plans for a standard field house, prepared by Loretta Toomey, of the St. Louis Public Library, are reproduced on page 701. It is pointed out that these plans would isolate the library to a great extent from the noise of the recreation activities in the building.

A Tribute to New Rochelle's Wild-Wood Park

NEW ROCHELLE, a suburb of New York City, with about 40,000 population, has as choice an educational and public school atmosphere as has any city we have ever known. What other city has appropriated three million dollars for new senior and junior high school buildings without a campaign, without a public hearing, without any expressed or suspected opposition? What other city has never had any known opposition to the increasing of the salaries of teachers?

But that which has captured our admiration completely is the one hundred and fifteen acres of native forest, with every variety of tree and shrub that grows naturally thereabouts. We rambled in those woods with greater joy than since our boyhood days. Six women's organizations of nature lovers, health promoters, welfare planners, civic reformers, educational devotees, joined the Parent-Teachers in aspiration to have such a wild-wood park serve the public. These all accepted the leadership of Superintendent Albert Leonard of the city schools, who suggested Katherine Dolbear's directorship of the uses of these wild-wood acres.

Already more than fifty varieties of shrubs and wild flowers have been catalogued, mostly seeded or planted in soil especially adapted to them. Some shrubs or plants bloom in abundance every day from the earliest to the latest seasons. And this is a birds' paradise. They can be seen and heard every day of the year. There are bird houses adapted to the tastes and habits of various birds, and bird restaurants—half cocoanut shells—with abundant food on all occasions. Last winter when so many birds of the forest perished in the severe snow-storms, the schoolboys of New Rochelle on snow-shoes threaded their way to all these bird restaurants and replenished the cocoanut shells with foods. The children are as proud of this wild-wood park as is Dr. Leonard or Miss Dolbear. Not only are the teachers and children members of the six organizations interested in this nature garden, but the county, the state, and the nation are keenly appreciative. The State and National Forest Service gave each of the six thousand school children a young tree or shrub with instructions how and where to plant and care for it.

—A. E. WINSHIP, in the *Journal of Education*.

Stephen's Green

By Winifred M. Letts, in *The Forum*

That God once loved a garden
We learn in Holy Writ,
And seeing gardens in the spring
I well can credit it.
But if God walks in Dublin,
I think that He'd be seen
Pacing up and down the paths
That lead through Stephen's Green.

From tenement and basement,
From evil court and slum,
In broken boots and tattered skirts
You'll see the children come.
For them the unforbidden grass,
The happy water's sheen,
The flowered shrubs, the tulips' pride,
The peace of Stephen's Green.

They scamper and they tumble,
They wander hand in hand;
Watching the clamorous waterfowl,
Entranced the children stand.
So poor you are or weary,
So dowdy or so mean,
You'll find a bench and welcome
Each day in Stephen's Green.

And so I should not wonder
Nor hold the tale untrue
That God has often walked there
In robe of skiey blue.
Among the little children
Benignant and unseen,
Blessing the man who gave the poor
The grace of Stephen's Green.

Operation and Control of Traffic Signal Systems

By K. W. Mackall

Traffic Signal Engineer, Crouse-Hinds Company, Syracuse, N. Y.

THE average large city has a principal business zone, in which traffic is highly congested. On one or more sides of this main business zone there may be secondary business zones, consisting mainly of small shops, and leading from the business zones there are one or more well-traveled routes leading to the residential districts, routes to other cities, amusement parks, factory zones, etc. The plan of such a city is presented in the accompanying diagram.

Let us assume that traffic conditions warrant the installation of signals in all three business zones along the highways leading to the residential zones and to the edge of the factory zone. Traffic conditions in the three business zones are different, therefore the signals and control apparatus for these three zones should be kept entirely separate, in order that they may be timed differently, or that one or more zones may be shut down entirely. At times, maybe Saturdays, when all three zones carry a heavy burden of traffic, or Sundavs, when traffic is light in all three zones, it will be found advisable to interconnect them and operate them from one variable automatic timing switch, thus permitting an even flow of traffic throughout the three business zones.

The chief function of a traffic control system is to permit the safe and rapid flow of traffic from one section of the city to another. It is therefore necessary that the principal arteries of travel from residential zones to business and factory zones be controlled. It would be folly, however, to connect the signals along these arteries to the timing switches controlling the business zones, since the flow is entirely different. But it is very important that traffic into and out of the business zones be put in step with the timing of the business zones.

Traffic along the connecting arteries is mainly one-directional, with little or no cross-traffic. The timing switches controlling these arteries should give a long interval for traffic along the arteries and a relatively short interval for cross-traffic. Traffic within the business zones is apt to be more evenly distributed and require a more even division of time. Now, in order to accomplish a smooth flow of traffic into and out of the business zones, it is advisable to connect the signals at two or three of the intersections along these connecting arteries with the signals in the business zone. The rest of the signals along any given artery should be on a separate timing switch. This forms a break in the synchronous operation of the signals along the connecting artery, and this break should properly come so that there is a long block between the two timings.

In our hypothetical plan there are shown three of these arteries connecting the main business zone with the main residential zone. If these three connecting arteries are a thousand feet or more apart, it is useless to interconnect them, but if only a block apart, the three streets should be interconnected and operated by a single timing switch.

Three Chief Elements in Traffic Regulation

The most important single element governing the selection and location of traffic signal equipment is safety to both vehicular and pedestrian traffic. Clear, well-located signals, properly installed and timed, will accomplish this factor of safety. Next in order of importance is the expedition of traffic, that is, keeping traffic moving as rapidly as is consistent with safety. This phase of the problem covers the method of operation, as well as the type and flexibility of control. The third phase of the problem is one which is of great importance to the taxpayers; namely, the efficient and economical utilization of the traffic squad.

Systems of Control

There are four methods of operating signals; namely, synchronous, progressive, coordinate, and isolated. All of these methods are in use in the United States and each has its advantages and disadvantages. The meanings of these four methods of operation, namely, synchronous, progressive, coordinate, and isolated, are well defined, and each covers a separate and distinct method of operation. (The meanings

are explained in detail on page 705.) Full and complete understanding of these terms is necessary, and they should not become confused. The selection of the one to be used depends not only upon the flow of traffic, but upon the geographical layout of the area to be controlled, the arteries feeding this area, and the results to be obtained.

In a signal-controlled area the traffic squad acts in a supervisory capacity only. Signals to go, stop, turn, etc., are given by the traffic signal system, and the officers of the traffic squad merely watch conditions, but are ever ready to act in an emergency, give directions, assist the infirm, and check violators of the system. In other words, the traffic officer becomes a man again, instead of a machine—a human semaphore. This releases traffic officers for other posts and permits the more complete covering of a city with the existing traffic force. It is a well-known fact, proved by the experience of hundreds of cities, that after a signal system has been installed and is operating smoothly, a large part of the old traffic squad may be moved. Signals are so generally used, so widely known and understood, that vehicle drivers and pedestrians instinctively obey them, realizing that signals are installed primarily for their own safety, and that a violation of the signal system is very apt to cause an accident, which might result in injury or death.

The Traffic Engineer

The best thing for any city to do is to place all phases of its traffic control under the head of a competent traffic engineer, clothed with sufficient authority to accomplish the results. Such a man must study the particular problem before him, call in competent traffic signal engineers, consult with the city's electrical bureau and let these men help him solve the problem. The job is too big for one man. The traffic engineer must know every phase of the traffic problem in his city and the results to be obtained. The signal engineer can tell him of the signals and control apparatus available to accomplish the desired results, of what has been used under similar conditions, and in general can save the traffic engineer much time because of his experience in other cities. The city electrical bureau can help the traffic engineer lay out the circuits, grouping the signals correctly, locate the control apparatus, and, in general, help give the desired flexibility. Above all, the entire system should be designed with a view to economically extending it to more completely cover the city in the future when the need shall arise.

Grouping of Signals

After the congested area and the outlying districts have been properly zoned from a traffic-bearing standpoint, great care must be given to the grouping of signals for the various electrical circuits. The modern tendency is to use small relay stations having a capacity of five or six intersections. The use of small groups means usually a saving of copper and a great increase in flexibility, as a group of signals may quite easily be transferred from one traffic zone to another, should changing traffic flow demand it. The grouping of signals should be made only after an exhaustive study of the area, considering not only the present installation, but future requirements as well. In this manner only can the desired flexibility and economies be obtained.

More important is the consideration of fire-routes and the location of fire-houses, assuming that the signal system is to be used to give a warning that fire apparatus is to traverse the district.

In cities which have only a few signals, the fire signal is usually displayed at all intersections simultaneously, since no great inconvenience is caused by stopping all traffic for the short time required by the fire apparatus to get through. But in the case of large installations it is not advisable to hold up all traffic while fire apparatus is passing through only a small part of the controlled area. The fire signal is usually set by remote control switches, sometimes requiring a second manual operation for restoring to normal, but better by automatically restoring time element relays which may be set to restore normal operation at any predetermined interval of time.

It is therefore of the utmost importance that a careful study be made of all fire routes, so that the fire-alarm operator may set the fire signals in as small an area as possible. This problem is one which cannot be solved easily and requires much thought and study on the part of the traffic engineer, the signal engineer, the electrical bureau, and the officials of the fire department.

The Central Control Station

The heart of any electric traffic signal system is the central control station, since upon its design and operation depends the success of the system. It is here that the experience and knowledge of the traffic signal engineer count most. The control of a small system is rather a simple matter; but a large system, consisting of several traffic zones and many fire control groups, requires the services of a most competent signal engineer. Of course,

FOUR METHODS OF OPERATING TRAFFIC SIGNALS

Synchronous Operation

Synchronous operation of signals means that all signal colors are the same in a given direction. In other words, green lights are displayed north and south, at all intersections, and simultaneously red lights are displayed in the east and west directions. This means that north and south traffic moves throughout the entire controlled area while east and west traffic is stopped. Then traffic is reversed, completing the traffic cycle. Synchronous operation of traffic is the simplest of all and is the method used in ninety-nine per cent of all cities. This method fits most cities, and such a system may be installed and operated at a minimum of expense. Control apparatus takes its very simplest form for synchronous operation, and is of such a nature that variations of timing may be accomplished throughout a wide range and with a minimum of delay. With a well-operated synchronous system of operation, the timing is changed several times a day and from day to day to suit the ever-varying flow of traffic. Morning rush-hour, noon-hour, afternoon rush-hour, evening, and between these periods, all affect traffic flow. Saturday and Sunday traffic are different from week-day traffic, and all require different timing.

Progressive Operation

The progressive operation of a signal system is an attempt to keep traffic moving continuously in all directions, and in many cities it works to very good advantage.

To accomplish this system, the street to be controlled is divided into blocks of approximately even length. These may be ordinary city blocks, or traffic blocks each comprising one, two, or more city blocks. If a traffic block is 1,000 feet long it may be made up of two 500-foot city blocks or two 300-foot and one 400-foot city block.

Signals at the beginning of each of these city blocks are reversed, that is, alternate red and green. At an average speed of 20 miles per hour a vehicle travels 29.2 feet per second, which means that in 30 seconds it will travel 905 feet. The motorist may easily adjust his speed to catch each successive green light as it appears.

The progressive system can be successfully operated only when the time for north and south traffic is exactly equal to the east and west timing. An uneven timing will not work at all satisfactorily. Under this system all signals are connected to the same set of buss wires and operated simultaneously. Control apparatus for handling the progressive system is the same as for synchronous operation.

Since north and south traffic, as well as east and west traffic, is theoretically moving at all times, there must be gaps in the flow of traffic for cross-traffic to get through. Theoretically, every alternate block is full of traffic, and the rest have no traffic at all. As a matter of fact, this does not obtain in actual practice, since vehicles and cars pulling out of parking lanes help fill up the supposed empty blocks.

The progressive system works best on wide thoroughfares with long traffic blocks. Short traffic blocks requiring very short timing or slow speeds do not work so well. Narrow streets carrying only one lane of moving vehicles and one parked lane for each direction, do not work at all well, since the parking of a car or driving a car away from the curb will hold up the moving lane of traffic and throw the block of traffic off the running schedule.

Coordinate Operation

The coordinate operation of traffic signals requires an elaborate system of wiring and an intricate automatic control switch. The installation and maintenance expense of this system is only justified in the largest cities over a very restricted zone traversed by the most congested traffic. With this method of operation, each intersection may be differently timed and varied at will. This means that a cable must run from each and every intersection to the central station and that each intersection must be handled by a separate variable timing switch. Upon the proper timing and coordination of these independent control switches depends the success of the system. Such a system is of great advantage for handling corners involving bad turns, particularly of street cars. Assume for the moment that the general timing along a street is 50 seconds "Go" and 40 seconds "Stop," or a total of 90 seconds. At a particular intersection having a heavy street car loading or turning movement the timing can be changed to 60 seconds "Go" and 30 seconds "Stop." This extra 10 seconds may materially help such a situation without seriously impeding cross traffic.

The coordinate system of operation has all the advantages of the progressive system and is much more flexible. Up to the present time it has been installed in only one city and is being installed in another. Traffic engineers and signal engineers are watching it carefully, studying the flow of traffic with a view to determining its merits. It is too early yet to determine whether or not the extreme flexibility of the system is advisable in handling traffic and, if so, whether or not the heavy expense involved is warranted.

This much is certain, it is the acme of flexibility. The problem is whether or not the central control station can be adjusted to the ever-varying flow of traffic to take full advantage of this flexibility, whether or not the complicated control mechanism will stand up in actual service, and whether or not the expense involved is warranted.

Isolated Signals

Isolated signals, as the name implies, are those which stand alone, not connected with any other intersection. They are used at important cross-roads in small towns and villages, and also in the outlying and residential districts of the larger cities. Wherever two important thoroughfares cross, an isolated signal can be used to advantage. It will segregate the lanes of traffic and make for safety wherever installed. Formerly, such intersections were handled by traffic officers, working one or two shifts per day, or sometimes only during a few hours per day. The installation of such isolated signals will relieve the city of this man-power expense and will permit the control of a large number of intersections for the expense of a single traffic officer. Such isolated signals are obeyed by the public.

Many cities have one or more motorcycle officers patrolling a large number of these outlying intersections, exercising general supervision, changing timing to suit the hourly or daily traffic flow, and apprehending the occasional willful violator.

no hard-and-fast rules can be given for the design of central control stations, since the problem is purely local. But certain fundamentals govern all installations, and these fundamentals will be given in the following paragraphs.

One cardinal fact can be stated at the outset, and if this fact is kept constantly in mind, success is apt to attend the installation. Traffic is complicated and ever changing and, therefore, the absolutely perfect system cannot be hoped for. By this is meant, no system can be designed which will give instant right of way to all vehicles and pedestrians at the instant such right of way is desired. The public is of varying degrees of intelligence, and the operation of the system must be readily understood by all. The fact always to be kept in mind is therefore—simplicity. Put in what flexibility of control and operation is necessary for the successful operation of the system, and not one bit more. Do not burden the system with extra flexibility or complicate it with control features which may never be used.

In general, each traffic zone should have an automatic variable timing switch of its own, but the central station should be so designed that certain zones may be connected together and operated as a unit, from any of the automatic timing switches. This interchangeability of automatic controls makes for reliable operation. An auxiliary manual control switch should be provided for each zone and provision made so that the change from automatic to manual operation and vice versa may be made instantaneously. The central station switchboard must be designed to be "fool-proof"; that is, it must be of such a nature that the throwing of wrong switches cannot damage the system nor interfere with its operation. Each and every outgoing circuit should be equipped with tell-tale lights to indicate its operation.

The automatic variable timing switch must, of course, have a range sufficient to meet the demand of traffic, a demand which is constantly varying. The resetting of the timer must necessarily be a a simple operation, accomplished instantaneously, without the use of tools and without even interfering with the operation of the timer. The variation in timing should be gradual, in steps of a second and not in jumps of five or ten seconds. The dials should all be direct reading, so as to be easily understood by any traffic officer or central station operator—who should not be called upon to make mathematical calculations.

A timer which does not meet these requirements should not be used.

Auxiliary Local Manual Control

The question of outside local manual controls, either for certain groups or for individual intersections, is a problem which should be carefully considered. Such local controls not only add to the installation expense of a system, but also complicate it, and often such controls do more harm than good. Local manual control switches at intersections present a temptation to supervising traffic officers, in that they are prone to use them. In using these local controls, an officer may greatly benefit a single intersection, at the same time shifting traffic to other intersections which are not ready to handle it. It is therefore advisable to use as few auxiliary switches as possible.

The use of the local "All-Red" switch at every intersection has several good points in its favor. It denotes a real emergency and will be used only when absolutely necessary. In case of an accident, the officer in charge of the intersection can throw the local "All-Red" switch, hold back all traffic, clear away the obstruction, put traffic in step with the rest of the system, and then restore normal operation. When using the "All-Red" switch at a local intersection, the officer must get out in the center of the intersection and direct traffic with his arms. This fact alone prevents an officer from using it except when absolutely necessary.

Outside group manual control of a traffic zone, or of a group of signals within a zone, is valuable only under certain conditions. An emergency may arise whereby not merely one intersection but several may be blocked, and in such cases a group manual control, operated by an officer who can see the obstruction, may be a valuable aid in expediting traffic by diverting it into open channels. These outside group manual controls are also very helpful in handling a parade, a funeral procession, a fire within the district, etc.

Outside manual switches for either an individual intersection or a group of intersections should be installed only when necessary, and when installed should be used only in a real emergency, bearing in mind that a continuous regular traffic flow will accomplish most in the end. Traffic officers should be instructed by the traffic engineer as to when and how to use such controls.

Wiring of the Signal System

The electrical connections of a large traffic signal system are often very complicated and the design of the wiring requires the services of capable engineers. The city electrical

bureau, the traffic signal engineer, and engineers of the local lighting company should all collaborate with a view to getting a simple, flexible layout which will meet the requirements of the system at a minimum of expense.

The general scheme of wiring depends upon the design of the system and the degree of flexibility demanded, while the method of wiring depends upon the availability of power, duct space, and general physical characteristics of the controlled area.

In small systems it is common practice to operate all signals from a power switchboard located at the electrical center of distribution. This is of course the simplest method of wiring and is also economical where the distance between signals is short and cable size can be kept down to number 6 wire or smaller. With this system, the power mains of the local lighting company are tapped only once, and all power for the individual signals is supplied over the signal power busses. This means that all moving parts of the system are at one point, under direct charge of the central station operator.

With large systems it is not possible to use this method, since signal buss wires would become too large and costly. It therefore becomes necessary to pick up power at several points throughout the controlled area and distribute it to the various groups of signals. At each point of power pick-up there must be installed a remote control relay panel, and power must be supplied to the impulse coils of these relays from the central control station. This may be done in either of two methods. First, cascade operation may be employed. This means that the impulse coils of each success relay station are connected to the ends of the signal power wires of the preceding group of signals. This method of wiring is economical, but it means that a defective relay will cause the failure of all signals beyond the point of breakdown. Where continuous, reliable operation is of prime importance—and this is generally the case—this method should not be employed. A separate impulse cable energized by and running from the automatic variable timing switch to the impulse coils of all relay stations will overcome this objection. With this method, the power busses from each relay station may feed in all directions to the signals within the group. This keeps the power wires and the impulse wires separate, and a failure of any relay station affects only the signals within that particular group, while all other signals operate normally. This method of wiring costs a little more than the cascade method, but it is more reliable. It should be considered in the light of cheap insurance.

The next step in reliability of operation is by cutting down the number of the intersections operated from a relay panel to a single intersection. This does away with all signal power busses and requires only an impulse cable connecting the relay panels at every intersection. The failure of a relay station then affects only one intersection. Such small relay panels are relatively cheap and, in many cases, their expense is entirely offset by the elimination of the power busses.

Before deciding to use this method of wiring, it will be necessary to check accurately the cost of having power available at every intersection. Often this charge is $75 to $100, sometimes even more. When signal control wires and the lighting company's power wires are run in the same underground duct system, or overhead along the same pole line, the additional cost is usually trivial. The only other point to be considered in connection with the use of this method of wiring is the fact that there are moving parts and fuse protection at every intersection, and this means a suitable maintenance department for servicing.

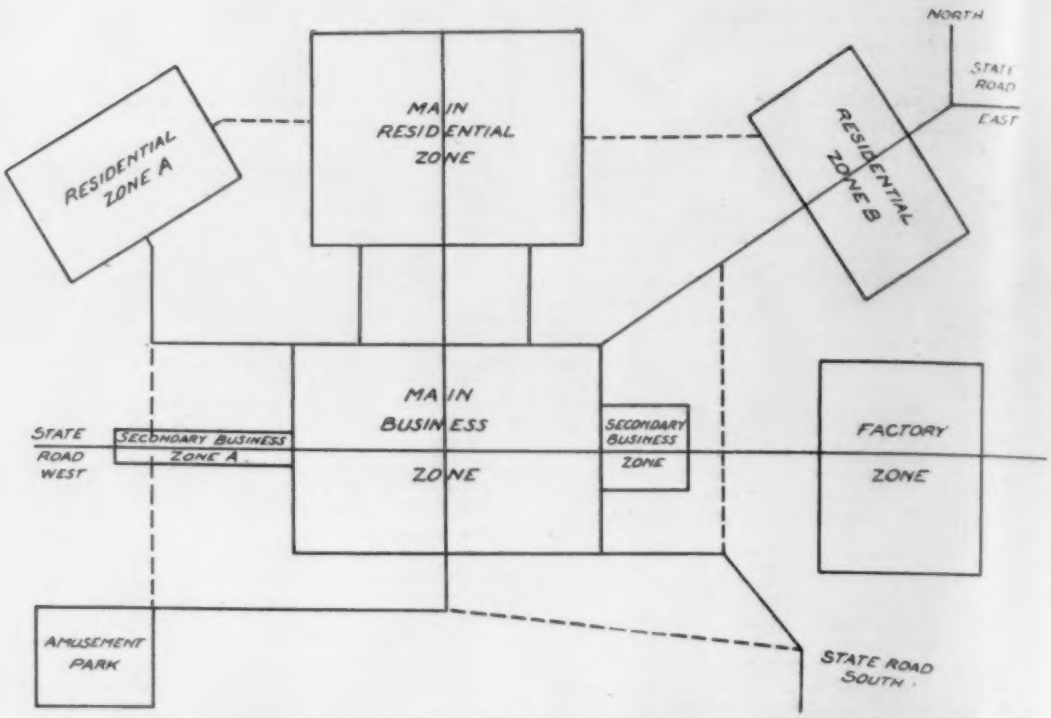
The so-called supervisory system employs the foregoing method of wiring plus the local control of all intersections and additional switching arrangements whereby the entire system may be divided into groups of any size at will, and each of these groups may be operated manually from any intersection within the group, with no connection whatsoever with the groups to the right or left of it. At first glance this would seem a very desirable feature. But actually, a signal system is seldom, if ever, so divided, since the cutting-loose of a group means going to widely separated points to cut out a group and then operating the group by means of a manual switch. Also, all signals beyond the group cut loose, that is away from the central control station, must be operated by a separate control switch.

The group supervisory system is a modification of the foregoing. The entire system is divided into zones or groups, and each of these is equipped with an automatic variable timing switch. The wiring is arranged so that all groups may be operated singly from one central control point. When control is from a central point, all group control automatic timing switches are automatically cut out. When any group is cut loose, its own automatic variable timing switch is cut in and controls the group in question. The successive splitting up into groups may be done manually, or by remote control relays. This system plus whatever local control per intersection is required, makes a very flexible system and one which is best suited to the control of a signal system installed on several miles of one street on which traffic conditions change frequently.

Synchronous Motor Control

The cheapest method of operating signals in synchronism is by using synchronous motors at every intersection, all being operated from a common alternating-current source of supply. These synchronous motors drive timing switches at each intersection. Since motors of this type will theoretically always keep in step, that is, operate at the same speed, no connecting cable is required. There is no physical nor electrical connection between the various intersections, other than the network of alternating-current power and lighting wires of the local lighting company.

Of course, such a method of operation has drawbacks, else it would be universally used. The one great drawback is that no variation of timing can be had without shutting down the system, timing each and every intersection independently, and then throwing the timers in step again. This is a rather difficult job to do, requiring expert handling of the timers, and on even a medium-sized system requires several hours.



PLAN OF AN AVERAGE LARGE CITY IN WHICH A TRAFFIC SIGNAL SYSTEM IS TO BE INSTALLED

It also requires a local pick-up of energy at each intersection. Under ordinary conditions, the synchronous motors driving the individual timers at each intersection operate continuously for twenty-four hours a day. No shutdown is possible, else the system will get out of step. A motor failure or a contact failure means a complete shutdown and resetting of the intersection affected. Since variations in the timing are most essential to the efficient and successful operation of any traffic signal system, this method of operation will have a small field, limited to those systems which can be operated at one fixed timing.

Interzone Arteries and Highway Planning

With this method of operation, it is of course possible to have local manual control of any desired intersection. This is done by disconnecting the signal wires from the timing switch, leaving the timer, driven by the synchronous motor, running, and reconnecting the signal to a local manual switch for temporary operation.

Refer again to the zoning map of the city and there will be found a number of dotted lines representing highways connecting the various traffic zones. These highways are routes connecting the various outlying zones, without going through the main congested district. If such highways exist, they should be plainly marked; and if they do not exist, they should be built. These highways are short cuts and, if well planned and marked, will keep thousands of vehicles out of the congested area, which will not only save time for the vehicle driver taking the short cut, but will lessen congestion and save time for all vehicles within the congested area.

In most cities such routes are usually existent, but are either not known or else not used, because the paving is bad. If these highways are improved and plainly marked, they will be used to the advantage of all concerned.

ACKNOWLEDGMENT.—From a paper presented at the 21st annual convention of the International Association of Municipal Electricians, held at Asheville, N. C., September 21-24, 1926.

MOURNING FLAG RAISED WHEN CHILD IS KILLED

Every time a child is killed by accident in Toledo, Ohio, a mourning flag will be displayed from the windows of the Toledo branch of the National Safety Council. This striking method of emphasizing the importance of public safety and particularly the need for greater efforts in protecting boys and girl was adopted last summer by the local council, of which Jay E. Thompson is secretary.

In Stormy New York and Sunny Japan

OPENING SNOWBOUND STREETS IN NEW YORK WITH A WEHR ONE-MAN GRADER

The illustration above, taken at Broadway and 54th Street, New York City, shows a Wehr power grader, equipped with scarifier, which was used successfully in moving snow and breaking up hard, icy spots after one of the worst storms in New York City last winter

INTERNATIONAL HARVESTER MOTOR TRUCK IN THE SERVICE OF CIVIL ENGINEERING DEPARTMENT, CITY OF OSAKA-FU

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Model "L", shown above, mows and rolls 4 to 6 acres a day. With gang units attached it cuts 10 acres a day on one gallon of gasoline.

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Careful Maintenance Essential for Efficiency of Traffic Signals

By L. W. McOmber

Engineer, Esseo Manufacturing Company

ONE way in which traffic signal systems have suffered more than any other is in the maintenance of the equipment when it is operating. This is due, first, to the haphazard way in which this equipment has been purchased and installed, the whole of the installation and maintenance coming on some department which was not acquainted with the problem it had to meet; second, to the failure of the traffic department to realize the necessity of maintenance for the equipment; and, finally, to the lack of any systematic planning for maintenance. Compare the signal maintenance of the average city with that of railroad signals, where there is a trained force of men, special equipment, and a carefully organized maintenance department. It is interesting to us as manufacturers, and also in many cases disheartening, to go from city to city and see the difference in the appearance and operation of signals which have been in service for some time. In cities where maintenance has been considered, signals are operating at as high an efficiency as when first installed. In other cities where signals have been purchased and put up and seemingly forgotten, it is almost impossible to see the signals in the first place, and in the second place they are usually operating erratically and entirely unsatisfactorily.

Reflectors, Lamps and Roundels

In the signals themselves there is certain to be a dimming of the reflectors. Even though the signals are dust-tight, there is going on all the time what we term a "breathing" action; that is, as the air inside the signal casing is heated, it expands and escapes, then when the signal cools, the air contracts and outside air is drawn in. This air is bound to have some dust particles in it, however fine they may be, with the result that before long there is a fine coating on the reflectors and they should be cleaned. We have also to consider the lamps. A lamp, as we all know, has a life of approximately 1,000 hours of actual service. However, after the lamp has burned from 600 to 700 hours, the bulb becomes darkened and the brightness falls off materially. In some department stores a rule is made that no lamp is allowed to burn over 600 or 700 hours before it is removed from the fixture; yet, in many cases a lamp will be left in a signal until it goes out and the signal is left in darkness. With the new traffic lamp this condition will be improved to some extent, since the falling-off in brightness is not nearly so marked as in the old type-B mill-type lamp which we have been using. Still, this item must be considered. A third item is the roundels. They will become covered on the outside with a film made up of moisture, grease, and dust particles, and the inside will be covered the same as the reflectors. There should, then, be some systematic method followed of going over these signals once every so often, cleaning the reflectors and the roundels, and replacing the lamps. In connection with this it is interesting to know that practically all manufacturers within the last year have improved on their design by adding hinges or swivel-lugs on the casing for holding the door when open, so that the interior can be cleaned and the lamps replaced without having to remove the doors.

The city electrician who is of an inquiring nature will also find it of interest to number his signals and keep a log of lamp replacements, the average number of hours per lamp, and other interesting data. Much of value can be learned from such a record.

On the control unit, systematic attention is necessary. With the old drum type sign flasher, the brushes must be kept in repair and in alignment, and the flasher oiled. The newer type controllers should be looked over for loose connections, for excessive wear at any point, for poor contacts or defective tubes, and to see that oil wells are kept filled. It must be remembered that the more we get out of any piece of equipment, the more attention it must be given. We have to pay a price for results. The more adaptable a control mechanism is designed, the more flexible it is made, the better maintenance it must receive to keep it in good operating condition.

ACKNOWLEDGMENT.—From a paper on "Traffic Signal Installation," read before the convention of the International Association of Municipal Electricians, at Asheville, N. C., September, 1926.

for Economical Transportation

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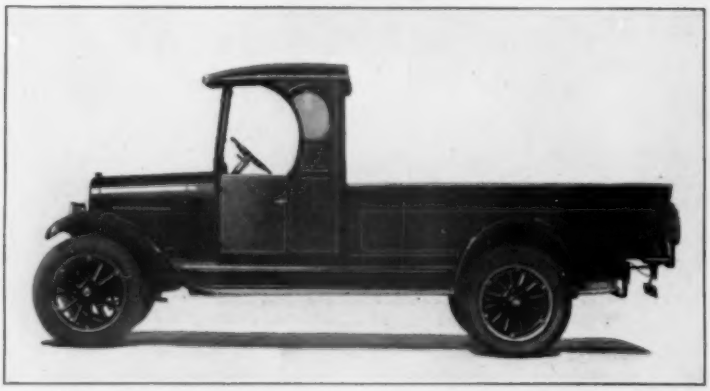

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Two-Light versus Three-Light Traffic Signals

IN the recent report on the traffic problem in Albany, N. Y., by the Mayor's Traffic Commission, a unanimous vote of the members in favor of the two-light system is recorded. Expressing strong opposition to the use of the amber light, the report states:

"The Traffic Commission recommends that a two-light system be used for all traffic signal lights in Albany; that a red light shall be used to indicate "Stop" and a green light to indicate "Go." Arrangements should be made to lap the signals so that for a brief period, ten seconds, between each change of traffic, a red light will show in both directions in order to allow for clearance of the intersections. This time should be equivalent to the interval during which the amber light is utilized in the three-light system.

"In recommending the two-light system, the Commission feels that this plan provides for greater safety than does the three-light system, which includes an amber light for the clearance interval. In railroad signals the amber light indicates "Proceed with Caution." During the clearance intervals at intersections, it is not desired that vehicles shall "Proceed with Caution," but that they shall "Stop." The use of the red light, showing in both directions during this interval, provides for an absolute stop and overcomes the tendency on the part of drivers to speed across an intersection or to slip ahead into it, prior to an authorized change of traffic movement."

Two Lights and a Soft-Toned Bell Favored in Portland, Ore.

To the Editor of THE AMERICAN CITY:

Our experience in dealing with traffic signals has taught us that a 2-bell warning for traffic changes has been very effective in controlling the pedestrian. On a recent visit to several of the large eastern cities, I found that in some of them the bells had been entirely eliminated because of complaints from business men and hotel proprietors about the loud ringing. In every case, however, where the use of traffic bells had been discontinued, the city eliminating the bells appeared to be deriving only about 50 per cent of the efficiency of its signaling system. Any person who has had experience in military training can easily understand that to attempt to drill a body of men without using a preparatory command before the command of execution, would render impossible a clear understanding between the commanding officer and those men who were to execute the command. In my estimation the traffic bell acts as the command preparatory to the control of traffic by signal, and when it is entirely eliminated the motorist and pedestrian are deprived of this warning as to just when a change of traffic will take place.

There are many things that enter into the complaints of business men regarding the bell and the control of traffic by signals. In one city, I found that there were in use traffic bells large enough and loud enough to be installed upon fire and police machines, resulting in constant complaint from persons easily irritated by unnecessary noise. In most cases where an 8-inch bell has been used and has caused annoyance, a 4-inch bell would have answered the same purpose and no doubt would have kept down criticism. I firmly believe that if the traffic-control systems throughout the country would use a soft bell, as is used in the city of Los Angeles, practically all complaint against traffic bells would be eliminated.

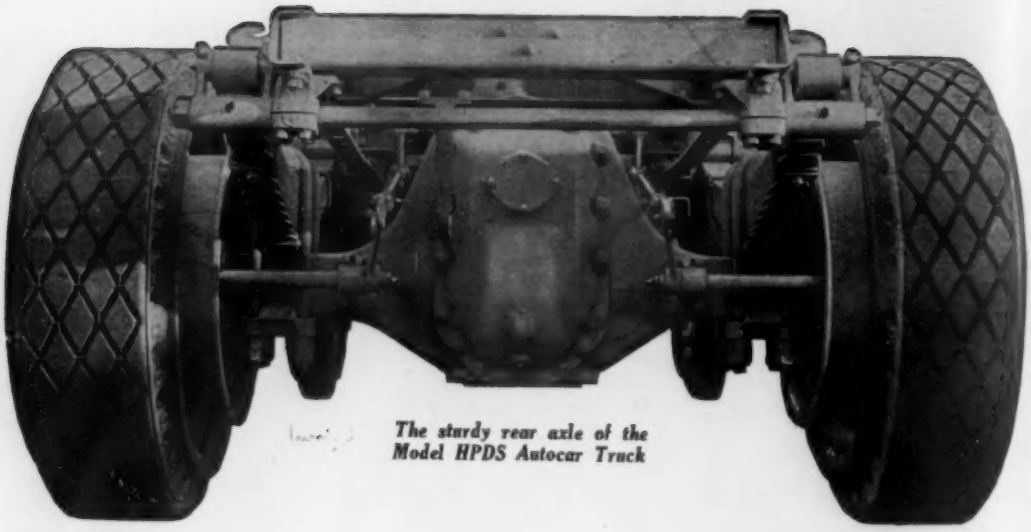
The question is sometimes asked if an amber light in a traffic signal would not answer the same purpose as a traffic bell. From my experience, the amber light is a confusing part of a traffic signal. It can, under no circumstances, answer the purpose of a bell. I strongly oppose any traffic signal which has more than two distinct colors of lights in it; in fact I am convinced that the amber light used as a warning of change in traffic direction has been the means of causing more confusion in regulating the motorist and pedestrian than any other one thing connected with traffic signals.

When the amber light is used, the motorist and pedestrian are required to look at three different colors of lights instead of two. This is confusing, and my study of the control of traffic by signal taught me that the pedestrian and motorist give themselves warning, to a certain extent, by the flow of the traffic. If traffic is flowing in a northerly and southerly direction, and a ring of a bell takes place, it is not necessary for the motorist or pedestrian to locate any traffic light or signal; the bell is the most understandable way of advising the traveling public that a traffic change is taking place, and the ringing of the second bell will move the traffic in an easterly and westerly direction.

I shall strongly insist that any traffic signal adopted in this city shall have only two lights, one red and one green, with a six- to eight-inch lens, and with a two-bell ring, as a traffic change—the bell to be not over four inches in diameter and of the latest model, soft-metal type that has a soft ring and that does not interfere with the peace or quietness of the community.

A system of this kind is valuable not only in regulating traffic, but in case of a bank robbery or of the police attempting to stop thieves or robbers in the congested area of the city; within an instant, the central control station can stop all traffic in the congested area. If there should be a fire, and the fire apparatus was required to travel through the congested area, different sections of this traffic-control system would be so arranged as to stop all traffic in all directions, thus making it possible for the fire department to travel through the streets, arrive at a fire, and save many minutes of valuable time.

FRANK ERVIN,
Captain, Commanding Traffic Department, City of Portland, Ore.



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What Is an Industrial Survey?

By William D. Ennis

CHAMBERS of commerce in a great many cities are interested in, and talking about, industrial surveys. So also are a number of municipal governments in various parts of the country. Active interest in the subject seems to have developed largely as a result of the so-called comprehensive industrial surveys conducted by the Chambers of Commerce in Cincinnati, Dayton, Fitchburg, Schenectady, and a few other cities.

The term "industrial survey" is beginning to be used rather glibly. Commercial organizations and civic groups use it almost as if it described a panacea, or at least a definite prescription. There is even talk of standardizing the article, so that when a survey is contemplated, parties interested may budget its cost—so much for circulating questionnaires, so much for conferences, so much for field studies, etc. There seems to be an impression in some quarters that a new tool or method has been developed for automatically drawing new industries to a particular city or region.

It may perhaps be useful to consider a few facts (as they are believed to be) about industrial growth and industrial surveys. First, as to industrial growth:

1. The industrial plants of this country are not trekking around like motor campers looking for a suitable place to stop. The large majority of them, and probably all of the important ones, are rather firmly anchored where they are. They are not going to move except for very good reasons.

2. In almost every city there are vacant factory buildings. In many cities there are large amounts of potential factory floor space not being utilized. There is still some surplus of manufacturing facilities in the country as a whole, as there has been ever since the end of the war. It is entirely possible for any industry requiring additional space to find that space on reasonable terms in almost any part of the country.

3. Industrial plants in the past have frequently, perhaps usually, been located without any real analyses of the factors which should influence location. More than one plant, probably, has been built in some particular city because the owner or his wife wanted to live there. A very large proportion of plants have grown up in certain cities because those who developed them did live there. Man does not live by bread alone. Wherever resident ownership is going to be involved, the characteristics of the city as a place in which to live will have a great deal of weight, and the city of present residents has a great advantage over any other prospective city.

The City Which Is to Prosper Industrially Must Be a Good Place in Which to Live

Many an industry is where it is because its projectors "happened to live" there. Where a man (or his wife) wants to live is a determining factor. Hence, in sizing up an industrial territory a great deal of attention must be paid to matters not strictly industrial. In the report of the Cincinnati industrial survey, two years ago, out of a total of twenty-five sections (or chapters), entire sections were devoted, each, to housing; municipal government and finance—a topic of special interest in the city, yet important everywhere; and public utility equipment, service, regulation, and rates. Parts of sections dealt with vital statistics; schools; water-supply; fire prevention, fire losses and insurance rates; and with what may be called (broadly) social opportunity. This last item included not merely park and recreation facilities as usually understood, but even such an apparently remote topic as the Cincinnati Symphony Orchestra.

The whole atmosphere of the city must be sensed in any analysis of its industrial potentialities.

4. However desirable such a practice might be, it is the fact that engineers and economists are rarely consulted in connection with the determination of factory location. Occasionally they are. When they are, they must obviously recommend that location which seems to be best, and not the location with which they happen to be most familiar or in connection with which they have made special studies. The fact that a particular engineer has been consulted about the industrial growth of a particular community gives no ground for assuming that he will in turn, when consulted by an industry seeking a location, direct that industry to the particular community referred to.

The foregoing facts may be regarded as a reflection of a pessimistic attitude toward the

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AMERICANS SHOULD PRODUCE THEIR OWN RUBBER... Harvey S. Firestone

possibility of any positive and directive control of industrial growth. There are certain facts on the adverse or optimistic side:

5. The standard of living of the American people as a whole has taken a step upward in last ten years or so. Practically no one expects it to step down again. Wages do not measure this effect, or only partly measure it. The fact is that people are consuming, and will continue to consume, more goods per capita than they ever did before. This is sure to take up the slack which now exists and to cause the early utilization in full of present excess manufacturing facilities. It would almost seem, in fact, since the standard of living has been very rapidly advanced, that we are in the presence of a great major factor analogous to the introduction of steam power more than a century ago, or the development of railroads across the United States about fifty years ago.

6. While the industrial development of the past one hundred years has been evolutional, one might almost say casual, that of the coming years is likely to be orderly, scientific, and rational. Conditions today are intensely competitive. A maximum of shrewdness and common sense must be exercised, not only in the actual operations of industry, but also in those preliminary steps of financing, promoting, locating, and constructing which permanently affect earning power. Thus, the matter of industrial location will in the future have very much keener attention than in the past. As a matter of fact, it is having the keenest possible attention in connection with the few important projects currently contemplated. It is even possible that the tendency toward the scientific selection of a location will cause some territorial adjustment of existing industry. Such readjustments in connection with certain lines of manufacture now illogically localized are badly needed.

7. The surest and soundest industrial growth will continue to be of the evolutional type. This means that where a factory is wisely located it may be expected to expand, to throw out offshoots, and to attract dependents. Nothing that a city can do in promoting industrial growth will count for more than keeping the way clear for such extensions and accretions.

8. If, on the one hand, industrial managers are going to consider the matter of desirable location much more intelligently than in the past, it is equally true, on the other hand that cities, through their chambers of commerce or otherwise, are going to be more positive, definite, and emphatic in their methods of interesting, attracting, and inviting new plants. For every industry seeking a location there will be several strong competitors. That competitor is likely to be strongest which, first, has a balance of favorable conditions to offer; and second (almost equally important), offers the facts regarding those conditions in the most convincing and authoritative way.

An Industrial Survey Can Do Only Three Things and Supply Only Three Services

Now this suggests one of the functions of that thing which is called an industrial survey.

9. An industrial survey, whether it be a scrap of paper or a ten-volume report, cannot bring a single new industry to any city. Only the active individuals of the city can do that.

10. An undertaking, properly to be described as a comprehensive industrial survey, will cost a considerable sum of money. It is not a cheap thing. It cannot be done by a cheap man. The effort to cheapen it must inevitably lead to a sacrifice, greater or less as the case may be, of the objective.

11. It may be assumed that an industrial survey will assist those locally concerned in their efforts to promote industrial growth. Of itself, however, it can do only three things and supply only three services. It can present facts and comparisons, can make recommendations for improvement, and can suggest ways and means for exploiting.

PRESENTING AND COMPARING FACTS

12. The presentation of facts is intended to picture the situation clearly to the prospective new manufacturer and (equally important) to the citizens. They individually are already in possession of most of these facts, but none of them has all of them. An orderly presentation gives a complete inventory and description of the community. If it is published fully and frankly, without reservations, qualifications, or evasions, it is extremely useful to those for whom it is intended, but ordinary collections of statistics about a city do not fill the bill. Such statistics are often obsolete. Many of those today are derived from the last Federal census, which is now seven years old. They are inadequate. Easily available statistical evidence on many important points is not to be found. They are non-comparative and, therefore, non-significant. The mere statement that the death-rate in Gopher Prairie, for example, is 15 means nothing whatever to the man unfamiliar with vital statistics. He does not know whether it is bad or good. Figures should be comparative with those corresponding in other cities.

Thus, the industrial survey of Gopher Prairie really presupposes in several important respects eight or ten other industrial surveys.

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Further, too many statistical presentations and purely statistical deductions are open to technical criticisms. Some of those offering them seem to have the vaguest possible conception of what is meant by a correlation. In general it may be said that statistical presentation of fact, such as is often issued, is not critical, not authenticated, and partial. This applies all along the line and includes items like population, values of industrial products, freight tonnage and many other things. Moreover, there has been a tremendous waste of energy in presenting altogether irrelevant statistics. Gopher Prairie may have 101.83 miles of water-main, but who cares? Figures presented to reflect the characteristics of a city should be reliable. They should be honest-to-goodness facts. A city offering statements of this sort to interest an outside manufacturer should present them as authoritative, as an investment banker offering bonds would present the facts about the physical valuation of the properties involved.

And statistics are a small chapter in the story. Figures are not bedside reading. Neither will busy administrators take the time to compare columns of numerical data. It is conclusions which are needed. The industrial survey should be the conclusive facts about the city, supported by figures and references where this is possible and by qualified and competent testimony. Otherwise the reader is not concerned to know whether the rainfall is two inches more or less in one city than another in an average year, but he does want to know what kind of city Gopher Prairie is and whether the conditions are favorable or unfavorable for his particular kind of manufacturing. The presentation must therefore have in mind: (1) the factors of all sorts which affect any kind of industry; and (2) the particular factors which may affect certain kinds of industry.

MAKING RECOMMENDATIONS FOR IMPROVEMENT

13. An industrial survey, if there is such a thing, should presumably be corrective and directive as well as merely pictorial. If unfavorable conditions are unearthed, an engineer at least feels an urge to show how they may be corrected. The kinds of unfavorable conditions which may be discovered are various. Intelligent recommendations with respect to them must be based on a variety of experiences and not on one's personality or temperament. The opinions of the engineer, the financier, the municipal administrator, and the man of definite industrial experience must all be brought to bear. Most cities have certain handicaps which cannot be corrected. Other handicaps can in theory be corrected, but in practice it would not pay to do so. Still others may be correctable at some determined or undetermined future date, while a residuum are more or less remediable.

14. Industrial development must be thought of broadly. The gain is not always or entirely the direct and measurable gain. For example, many of the port development enterprises now under way cannot be *directly* profitable until some separation of line-haul and terminal charges is accomplished. Nevertheless they will be profitable.

SUGGESTING WAYS AND MEANS FOR EXPLOITING

15. A hypothetical industrial survey will terminate with a definite program for the chamber of commerce or other sponsor organization looking well into the future. After it has presented a graphic statement of the assets of a community, it will show what to do about them, how to capitalize them, how to make the most of them. At this point the undertaking becomes more than an assembly of facts, more than a specialist's report. It becomes a matter of working out constructive policies. This involves diplomacy and strategy. In every city there are found what seem to be definite and immediate opportunities. Ways and means of seizing these are proposed, discussed, modified and set to work.

Enough has been done in the field to lead to two or three standards or crystallized conclusions. One of these is that the city which gives money directly or indirectly in the effort to obtain new industries is making a mistake. Another is that typical enterprises, like incubator buildings, industrial funds, and land option enterprises must be carefully adapted and modified to suit the local situation. Blind following of what has been done elsewhere may lead to disaster. Take the matter of industrial funds, for example. The method of operating such a fund in Easton is diametrically opposite to the method employed in Louisville. Both methods are good for certain conditions. In a city where there is an actual shortage of capital, as here and there exists, neither method would be satisfactory.

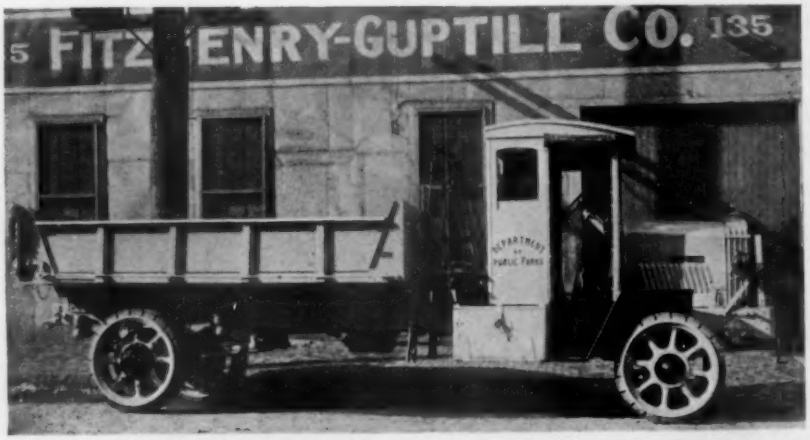
16. Certainly, this thing which is being called an industrial survey is earmarked with success. Every city which has gone through the pressure or submitted to the operation testifies that way. It is a still more significant fact that in every instance within the purview of the present writer, a nearby city—sometimes more than one of them—has become interested and finally decided to try the same prescription.

The Solid Stream Method Can be Safely Used Near Dwellings

POWER SPRAYERS

In last month's issue we illustrated the City of Springfield's apparatus as a spraying machine, while in this issue we illustrate the same apparatus with spraying attachment removed and a Wood hydraulic dump body in combination with a Mead-Morrison winch in place.

In mounting the sprayer attachment, it is not necessary to disturb the hydraulic hoist or winch, only the body proper needing to be removed; the actual time involved in making such a change being less than one hour. A valuable equipment for any Department. Catalog on request.



The City of Springfield's Apparatus as a Commercial Truck

FITZHENRY-GUPTILL COMPANY

135 FIRST STREET, EAST CAMBRIDGE, MASS.

Preliminary Training of Firemen

How Illinois Is Educating Its Fire-Fighters Through Short Courses at the State University

By John G. Gamber
State Fire Marshal of Illinois

IT would be a wonderful thing for this country if it were possible for the firemen in all the cities to have the advantage of a fire college, but we must dismiss the thought as entirely out of the question. None but the very large cities have the revenue with which to do this. Nor would it be practical to try to establish anything like a fire college in our small communities. A great many of them are manned by volunteer firemen—men who give their efforts to the city in time of fire because they love that kind of service. These men receive little or nothing for their services and must gain their livelihood through various vocations and occupations. They could not give a great deal of time to a course of training. Still, they need the instruction badly. Great loss comes through fires which get away from the fire fighters because of their lack of training. Much unnecessary loss is caused by throwing out more water than is needed.

To Make Fire-Fighting More Effective

To overcome the handicaps to fire-fighting which so often result from lack of proper knowledge of how to handle fires, and to build up intelligent cooperation among the communities of the state in reducing fire losses, are the special objects of the successful efforts in Illinois here outlined. The article comprises the major part of an address delivered by State Fire Marshal Gamber before the convention of the International Association of Fire Engineers at New Orleans last month.

The fire problem is much simpler in the small communities than it is in the large ones. A course of instruction which would serve one class of communities would be altogether insufficient in another class. Vice versa, a course of training which would be adequate in the larger cities would be more extensive than is necessary in cities or villages of smaller population.

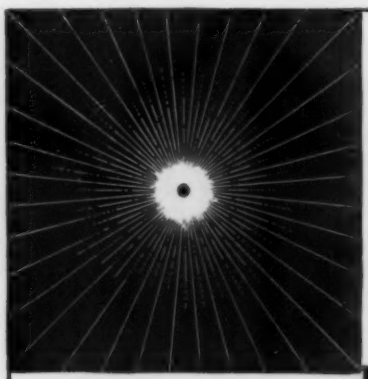
The thought occurred to me several years ago that a short course at our State University, similar to short courses given in agriculture, electricity, and other subjects, might offer a solution to the problem. I have always worked in close harmony with the Illinois Firemen's Association. I broached my idea on the subject to the Association, with the result that I introduced a resolution at one of its conventions, instructing officers of the Association to take the matter up at once with the State University. We found the President of the University favorably inclined to the suggestion, and in June, 1925, the first short course on fire prevention, control and extinguishment was offered to the firemen of Illinois.

It was a four-day course and included lectures and instruction on all the essential features of the fire problem. Men who are regarded as authorities on various phases of the problem came from various parts of the United States to help us conduct the course. In addition to lectures, there were practical demonstrations in hose work, life saving, first aid, and emergency fire extinguishing.

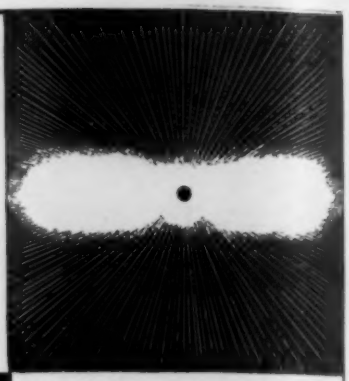
This was the first course of its kind ever attempted in the United States, and we were highly gratified to find that the total enrollment for the course was 219. We were informed by officers of the University that the enrollment was larger than that which any other short course had received at the time it was first offered.

We went further than to invite fire chiefs and firemen to this course. It was opened to all city officials interested in any phase of the fire problem, including commissioners of public health and safety, building commissioners, building inspectors, electrical inspectors, and others; also to the industrial and mercantile concerns of the state that are interested in fire control in their own plants; in fact, the course was open to all who were interested to any extent in the subject. One of the most gratifying features of the course was that 95 were present at the last session of the last day—almost half of the total enrollment.

Forty-two of our 102 counties were represented, and the number of communities represented was 63. It was pleasing to note that the men came not only from the larger cities



Light distribution of bare lamp

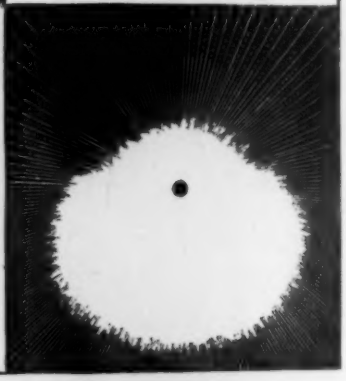


Light distribution of Holophane 2 way Refractor

Light distribution of Holophane Bilux Refractor

Light distribution of Holophane 4 way Refractor

Light distribution of Holophane Asymmetric Dome



All diagrams show the light distribution as viewed from above.

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of the state but also from the smaller communities. There were volunteer firemen sitting alongside paid firemen, and city commissioners, mayors, and aldermen sitting alongside engineers from public service companies. The proceedings of the course were printed verbatim in an attractive book, and requests for this book were received from all over the United States and from countries as far distant as Australia.

The first short course was more or less of an experiment, but before it had closed we were sure that we had created a permanent institution. Those present unanimously adopted a resolution asking that the course be held annually, and plans were immediately formulated for the second short course. This course was held in June of this year. Taking advantage of the experience gained in the first course, we were able to prepare a more elaborate program. One of the new features was a drill tower. We brought Anthony McGrann, instructor in the Philadelphia Fire School, to conduct demonstrations in first aid and resuscitation, and Deputy Chief Thomas F. Dougherty of New York conducted the ladder and hose work. The group meeting plan was tried out to a limited extent in the second course, for the benefit of those interested in special phases of the fire problem. The registration at the second course was 236, an increase of 17 over the attendance at the first course.

Two Obstacles to Be Overcome

In carrying through a course of this kind, there are two quite serious obstacles to be met. One is the customary lack of interest on the part of a great many mayors and city councils. In some communities it is very hard to induce the city government to vote the necessary money to send some of the firemen to the short course, despite the fact that the only expense involved is for railroad fare, lodging, and meals. We conducted quite a campaign among mayors to make them see the wisdom of sending their fire chiefs and one or more of their firemen. In many cases volunteer fire departments used their own funds to send one or more of their colleagues to the course. This is a splendid tribute to the spirit of the men who make up volunteer fire departments in Illinois communities.

The second problem is that of providing a course which will be interesting as well as practical to the firemen. Some of those who attended the first course did not attend the second, and one of the reasons some of them did not come back was that they expected that the meeting would be largely a matter of having a good time, and of course they were disappointed. One of the prominent firemen of the state made the remark at the close of the last short course that as soon as the fire chiefs and firemen of the state realize what a valuable amount of instruction and training is offered, the enrollment will be no less than 500.

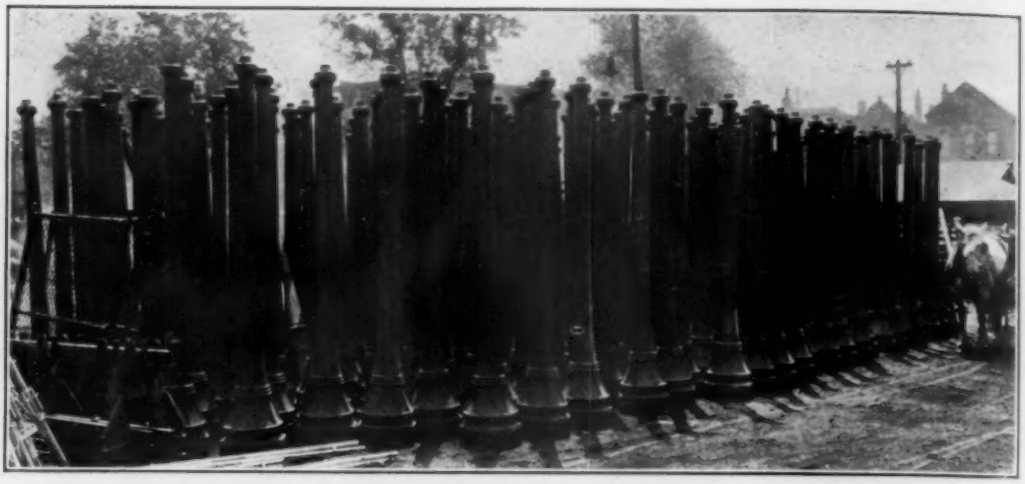
In the second course we were still feeling our way somewhat. We are trying to work out plans for future courses which will more perfectly meet the desires and needs of the firemen. By means of a questionnaire a canvass of all the fire chiefs of the state has been conducted, to find out what features of the course have appealed to them most, and what new subjects they feel should be given, and to secure their suggestions as to valuable ideas that should be carried out in the future.

Demonstrations and Forum Discussions

Practically all the firemen are agreed on one point—that there should be as much practical work and demonstration as possible. They feel that they carry away a great deal more knowledge in matters which they see demonstrated or in which they themselves participate than they do from the subjects covered purely by lectures.

Another important point, on which most of us are agreed, is that representatives from the various communities should be grouped according to the population of their communities. The purpose of this is to have subjects presented in group meetings which are especially important for cities represented in those groups. We shall probably have about three groups—one containing the smaller communities, another the larger ones and a third those in between. This will give an opportunity for special presentation of the problems that concern cities of various sizes. There are always fundamental subjects in which all who attend will be interested, but I am inclined to believe that the group idea will develop more and more as the course progresses. It is useless to give representatives from small communities technical instructions on special hazards that do not concern them at all. The time had better be spent in giving them elemental instruction on the things they ought to know. Vice versa, the group idea will give an opportunity for detailed instruction to the men from the larger cities on the various important special hazards with which they have to contend, as well as the more advanced methods of extinguishing and controlling fires.

The short course will also be made a sort of forum where chiefs may present for discussion any of the problems which confront them, and



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THE City of Chicago, too, is now installing King Ferronite Standards of one-piece construction. The above photograph, taken in a City yard, represents part of a recent order for nine hundred standards.

King Ferronite Standards, because of the features in their manufacture which assure long-time service without continual cost for repairs and replacements, are being accepted universally as the practical lighting system—a combination of the beautiful and efficiently useful.

Scores of cities, large and small, throughout the country are placing King Standards on their streets.

Your city's street lighting should be a long-term investment. Selection of the correct materials can make it such.

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Consultation is cost-free; installation is risk-free.

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upon which they would be glad to have the benefit of the advice and experience of other chiefs. I believe that will be one of the important features of future courses.

Other Important Features

We are also trying to develop the idea that chiefs who attend the course should go home and give their men the benefit of the things they have learned. The proceedings as printed provide a very good textbook for the chief to use for that purpose.

One of the important features of a short course is the fact that we can stimulate among the firemen of Illinois a much greater interest in reducing the fire loss. A course of this character is bound to put them on their toes a little more. The more a man learns, the more he wants to learn. More avenues of information are opened to him, and his interest is aroused.

We also believe that through the short course it will be possible to educate municipal officials to a more active interest in the affairs of their fire departments. The fire department of the average town often does not get a square deal from the city. I think a great deal of this is due to the fact that the city officials are not well informed as to the importance of their fire departments. Some of the city officials who have attended our short courses have become enthusiastic boosters in everything that concerns reduction of fire losses. I believe as time goes on we can get more and more city officials to attend or spend at least one day with us at the course. The proper interest of city officials is very important, because a successful fire department must have the backing of an interested city administration.

Signs of Increased Interest in Fire Prevention

AMONG the indications of increasing public interest in fire prevention reported at the recent fall meeting of the National Fire Waste Council of the Chamber of Commerce of the United States was the marked increase in enrollments in the 1926 Inter-Chamber Fire Waste Contest over the number reported last year. Up to the time of the meeting, September 29, 495 official entries had been received, as compared with 403 a year ago. Richard E. Vernon, Chairman of the Contest Committee, stated that plans had been laid to attempt to reach every entered chamber of commerce during the coming year through a personal visit by some representative of the Council.

Another equally encouraging report was that of the Speakers' Committee, to the effect that arrangements had been made by the Committee for 1,136 addresses to be delivered before chambers of commerce, noonday clubs, women's clubs, schools, and other bodies, during Fire Prevention Week—a number far exceeding that of any previous year. Formerly, the Committee found it necessary to seek opportunities to appear on the programs of local organizations; now the opposite is true, and more requests for speakers are being received than can be handled.

A Courageous Chamber of Commerce Editorial

IN striking contrast to the attempt too often made by commercial organizations to suppress reports of undesirable conditions in their cities is this recent editorial from the *Kansas Citian*, the weekly bulletin of the Chamber of Commerce of Kansas City, Mo.:

"Kansas City cannot well ignore the report of housing conditions among the colored portion of the population revealed in the report of Dr. Wm. J. Thompkins, negro physician and assistant commissioner of child hygiene and communicable diseases. Conditions pictured in the report are nothing short of a disgrace to the city.

"To bring some of the blighted districts of the city to a livable standard is a slow process. Condemnation may well be resorted to in some cases. Sewer connections and observation of existing sanitary ordinances may be demanded in others. However, looking to the future, the ultimate solution is in preventing the recurrence of the development of such conditions. This may be done through the adoption and enforcement of a modern building code. Fortunately, action on the proposed code appears to be probable in the near future, as it is now being reviewed by engineers for the City Manager with this end in view."

Searchlight on Hotel Roof Used as Police Signal

A 30-INCH, 43,000,000-candlepower Thomson-Houston searchlight, built more than 30 years ago by a predecessor of the General Electric Company, is credited with having been instrumental in reducing by half the number of automobile thefts in Worcester, Mass., where it is used as a police signal.

A few years ago the searchlight was placed on the roof of the Bancroft Hotel in Worcester as an advertising device, its beam showing the location of the hotel to motorists traveling by night. It has not been used for that purpose for some time, however. Last spring the light was repaired and since then has been used to warn patrolmen when bandits are operating in the city.

Members of the police force were instructed to watch for flashes from the light, and on seeing the beams from it, to go to the nearest patrol box where they are given the available details of the crime by police headquarters. After the warning has been given, the light is turned on the section where the crime was committed.

PROVEN POWER *for* DRIVING PUMPS

Guide No. 2190. June 25, 1926—Laboratories' File Ex903.

Climax Engineering Co., The, Mfr.,
Clinton, Iowa.

Engines, Gasoline.

Four and six-cylinder engines. For use only in driving multi-stage centrifugal fire pumps in the 750 and 1000-gal. sizes. Four-stroke-cycle type with 6-in. bore and 7-in. stroke.
Authorities having jurisdiction should be consulted before installation.
Marking: Model R4U-R6U.

STANDARD—Fire—under limitations specified.

REEXAMINATION SERVICE.

See description of Reexamination Service on guide card.

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207 EAST OHIO STREET, CHICAGO

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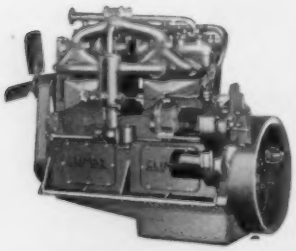
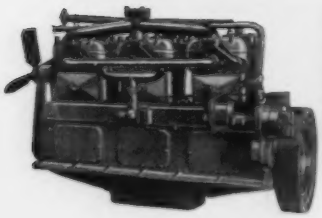
Climax Engines are the first and only Internal Combustion Engines to receive this recognition.



FOR 750 gal. PUMPS



FOR 1000 gal. PUMPS

CLIMAX

Trade Mark Reg. U. S. Pat. Off.

MODEL R4U

Four Cylinder, 6"x7" Engine, equipped complete to Underwriters' Laboratories' requirements. Maximum speed 1200 R.P.M.

We furnish Engine alone, or for those who wish to secure a complete Unit, four selections are available.

CLIMAX

Trade Mark Reg. U. S. Pat. Off.

MODEL R6U

Six Cylinder, 6"x7" Engine, equipped complete to Underwriters' Laboratories' requirements. Maximum speed 1200 R.P.M.

We furnish Engine alone, or for those who wish to secure a complete Unit, four selections are available.

Write for Bulletin I

You can secure Climax Engines through any Pump Manufacturer or his Agents, or from any of the authorized Climax Dealers listed below.

CLIMAX ENGINEERING CO., 61 W. 18th Av., Clinton, Iowa

Eastern Branch: 30 E. 42nd St., New York, N. Y.
Cleveland Branch: 857 Leader Bldg., Cleveland, O.
Chicago Branch: 2007 Harris Trust Bldg., Chicago
Southwestern Branch: P. J. Dasey, Hotel Wells, Tulsa, Oklahoma.
Los Angeles, Calif.: Coast Machinery Corporation, 464-86 E. 3rd St.
San Francisco, Calif.: Coast Machinery Corporation, 729 Folsom St.
Boston, Mass.: Rapo-Huckins, 59 Haverhill St.
New Orleans, La.: Woodward, Wight & Co., 451 Howard St.
Birmingham, Ala.: Keiser-Geismer Engineering Co., 1308-9 American Trust Bldg.
Denver, Col.: The Hendrie & Bolthoff Mfg. & Supply Co., 1621-39 17th St.
Indianapolis, Ind.: Carl Dunning Supply Co., 204 W. Maryland St.
Jacksonville, Fla.: Construction Equipment Co., 457 East Bay St.
Madison, Wis.: Wisconsin Machine & Foundry Co.
Minneapolis, Minn.: Wm. H. Ziegler Co., 618 Washington Ave. S.
Portland, Ore.: J. L. Latture Equipment Co., 354 Belmont St.
St. Louis, Mo.: Tuller Equipment Co., 2239 Pine St.
Omaha, Neb.: Interstate Machinery & Supply Co.
Montreal, Que., Can.: Edward C. Dingman, 1906 Keefer Bldg.

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The Elimination of Cross-Connections

Abstract of Report of Committee on Cross-Connections, Conference of State Sanitary Engineers

IN May, 1925, the Fire Protection Division of the American Water Works Association adopted a very strong resolution in favor of the prohibition of cross-connections between potable public water-supplies and supplies from other sources. In June, 1926, the Conference of State Sanitary Engineers passed a similar resolution, which also included the prohibition of auxiliary intakes and by-passes, as follows:

> *Whereas,* cross-connections, auxiliary intakes and by-passes between potable public water-supplies and supplies from other sources have been the cause of a large number of outbreaks of typhoid fever or other water-borne disease, and
>
> *Whereas,* check-valves and other protective devices or notifying the public in the case of using water from a polluted source through an auxiliary intake or by diverting the flow around an integral part of a purification plant through a by-pass, cannot be depended upon to adequately protect the public from disease,
>
> *Be it resolved,* that no physical connections should be permitted between any potable public water-supplies either through cross-connections, auxiliary intakes, or by-passes and other supplies, except as follows:
>
> 1. With another potable public water-supply.
> 2. With a potable supply which is regularly examined as to its quality by those in charge of the potable public supply to which the connection is made.
>
> This prohibition to apply to all piping systems, either inside or outside of any building or buildings; and be it,
>
> *Further resolved,* that definite programs should be inaugurated in each state and each municipality thereof to permanently eliminate all other connections; and be it
>
> *Further resolved,* that the Executive Committee of this conference transmit copies of this resolution to the Fire Underwriters Association and related organizations, also the American Water Works Association, New England Water Works Association, and other analogous organizations, with the request that they cooperate in securing the carrying-out of the provisions of this resolution.

Definitions

Cross-Connections.—A cross-connection is any physical connection whereby a potable water-supply system is connected with another water-supply system, whether public or private, in such a manner that a flow of water into the potable supply is possible therefrom, directly through the manipulation of gate-valves, because of ineffective check- or back-pressure valves, or otherwise. Examples of cross-connections include connection between the piping systems of two supplies containing either check-valves or gate-valves, or both, such as are frequently used in industries to provide auxiliary supplies for fire protection or industrial purposes. It is not intended that a cross-section will include those permitting water from a public supply to discharge into an elevated tank, cistern, or suction well, at an elevation above its high-water line, or with a tank wholly supplied from the public supply and properly protected against contamination.

Auxiliary Intake.—An auxiliary intake is any piping, connection or device whereby water may be secured from a source other than that normally used. Such connections include an auxiliary intake into a river or lake where water for domestic purposes is normally secured from another source; also conditions wherein water may be pumped from another source either by the owner of the supply or other agencies into the regular distribution system.

By-Passes.—A by-pass is any system of piping or arrangement whereby the water may be diverted around any part or portion of a water purification plant. Such connections include arrangements whereby the coagulating basin, filters, or sterilization equipment of a water purification plant may be by-passed.

Outbreaks of Disease

The Committee has a record of outbreaks of typhoid fever and in some instances of dysentery that have been caused by cross-connections, auxiliary intakes, and by-passes. This tabulation reports a total of 8,028 cases of typhoid fever with 226 deaths, as well as more than 11,000 cases of dysentery. Other outbreaks have undoubtedly occurred that have not been definitely recorded or that have not been found in the search of references. In any event, the sickness and deaths are appalling and sufficient to cause any group of officials to give careful consideration to the necessary steps to eliminate such dangers.

15 years of wear and tear!

Laid in 1911, the Trinidad Native-Lake Asphalt on West Fourth Street, Waterloo, Iowa, (photo looking northeast from Bluff Street), is reported still in good condition—and what is also important the maintenance cost has been so small as to be practically negligible.

Wherever Trinidad pavements are laid—and their use is as wide as the world—they continue to add to the fame of Trinidad Lake Asphalt. This native-lake solid bitumen possesses wear and weather resisting properties not attained in by-products, in artificially-produced asphalts.

Bermudez Road Asphalt is another native-lake product—specially adapted for road building. Interesting data sent on request. Write to the Barber office nearest you.

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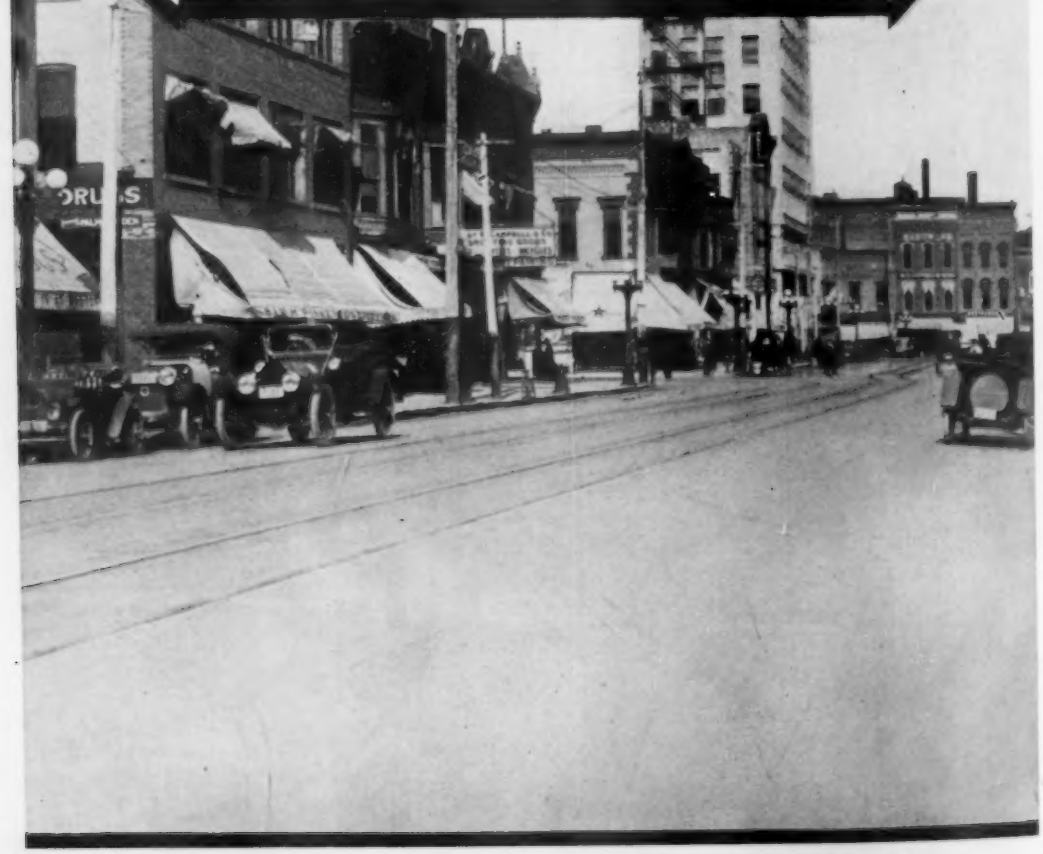


TRINIDAD LAKE ASPHALT

Liability

Courts have held on numerous occasions that the owner of a water-supply, whether a municipal or a private concern, is liable for damages caused by sickness resulting from the use of polluted water furnished by him. Below is recorded a synopsis of some such decisions:

Green v. Ashland Water Co. (1898) 101 Wis. 258: "If defendant knew, or from the situation ought to have known, the water it is distributing was dangerous for domestic use, from some cause not discoverable ordinarily by the exercise of reasonable care, it owed the duty to its customers of disclosing that danger, and a failure so to do, knowing that such customers were liable to use the water through ignorance of its character, was a fraud in law, rendering the defendant liable to legal damages to any person injured by such fraud without fault on his part, and it was also a failure of duty amounting to actionable negligence as well, to which the same liability is incident." $5,000 verdict involved.

Lockwood v. Dover (1905) 73 N. H. 209: Negligence was alleged in that defendant municipal corporation failed to clean out its water pipes or to provide means whereby they could be cleaned out, and that in consequence thereof foreign and decayed matter became lodged in the city's pipes, entered the pipes leading to the plaintiff's dwelling and was there drunk by the plaintiff intestate, causing him to sicken and die. It was held that the defendant was liable.

East Grand Forks v. Luck (1906) 97 Minn. 373: Based upon a study of the following cases —Reed v. City of Anoka (85 Minn. 294, 88 N. W. 981); Walla Walla City v. Walla Walla Water Co. (172 U. S. 1, 19 Sup. Ct. 77, 43 L. Ed. 341); Illinois Trust & Savings Bank Co. v. Arkansas (76 Fed. 271, 22 C. C. A. 171, 34 L. R. A. 518). Judge Elliott said: "When the municipality enters the field of ordinary private business, it does not exercise governmental powers. Its purpose is not to govern the inhabitants, but to make for them and itself private benefit. As far as the nature of the powers exercised is concerned, it is immaterial whether the city owns the plant and sells the water, or contracts with a private corporation to supply the water. It is not in either case exercising a municipal function..... When a municipality engages in a private enterprise for profit, it should have the same rights and be subject to the same liabilities as private corporations or individuals."

Keever v. Mankato (1910) 113 Minn. 55: "When a municipality voluntarily engages in selling and distributing water to customers for its local advantage or profit, it enters the field of ordinary private business, and has the same rights and is subject to the same liabilities as private corporations or individuals with respect to damages from impurity of the water. . . . . It is obvious that a sound public policy holds a city to a high degree of faithfulness in providing an adequate supply of pure water. Nor does it appear why the citizens should be deprived of the stimulating effects of the fear of liability on the energy and care of its officials; nor why a city should be exempt from liability while a private corporation under the same circumstances should be held responsible for its conduct and made to contribute to the innocent persons it may have damaged." $5,000 awarded.

Jones v. Mount Holly Water Co. (1915) 87 N. J. L. 106: "Water is a necessity of life, and one who undertakes to trade in it and supply customers....is bound to use reasonable care to see that whatever is supplied for drink....shall be reasonably pure and wholesome, and that negligently furnishing water which is deleterious to that human body or health will furnish a valid cause of action to a customer injured by the use of the water." "Actual notice or knowledge of the unwholesomeness of the water of the defendant company was not an essential element to be proven in order to establish the defendant's liability; it was sufficient if there was testimony tending to show that the defendant, in the exercise of reasonable care, might have discovered the unwholesomeness and dangerous condition of the water." $750 awarded.

Vennen v. New Dells Lumber Co. 154 N. W. 640: The facts in the case were briefly these: The employing company had a dual water-supply in its factory; one source obtained from the city mains, the other from a nearby stream which was badly polluted. The two water distribution systems were connected by a pipe in the boiler-room protected by a Globe valve reinforced by a check-valve set against the polluted supply. A number of employees were in the habit of obtaining drinking water from a faucet in the boiler-room which was located so that the polluted river water could reach it. Subsequent to the epidemic of thirteen cases of typhoid fever and two deaths, the valves were examined and found leaky. The Court held on the demurrer of the defendant that typhoid fever was a compensatable accidental injury. Sued for $20,000.

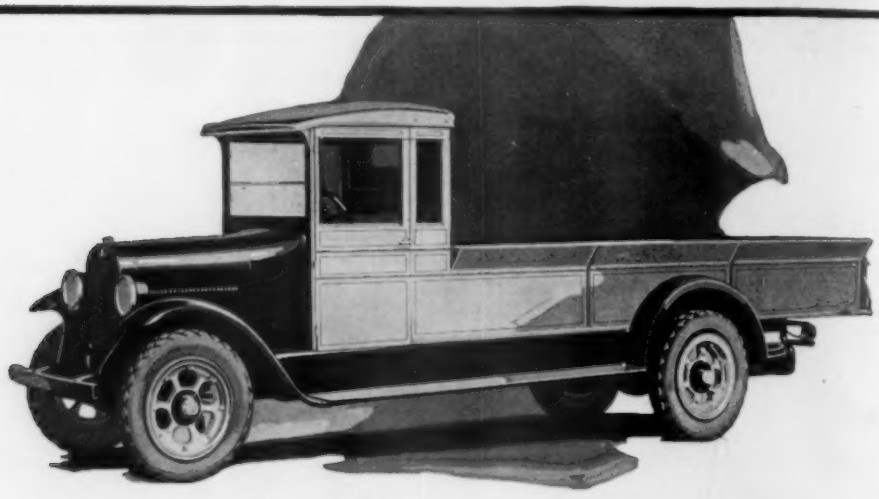
It is significant that in another case, Alex Vander Leest v. John Hoberg Company (Industrial Commission of Wisconsin Workmen's Compensation 10th Annual Report, July 1, 1921, to June 30, 1922, page 59), it was held by the Industrial Commission that compensation was due nineteen employees of the company who had contracted typhoid fever by use of water from a polluted well of the company. This case, however, was not carried into the courts. Compensation awarded, $2,233.61, medical aid, $1,742.94; total $3,976.45.

Stubbs v. City of Rochester (1919) 226 N. Y. 516. One seeking to hold a city liable for injury by typhoid fever, alleged to have been contracted from defendant's polluted water system, is not bound to eliminate all other possible causes of the disease to establish defendant's liability. That a city's contaminated water-supply was the source of typhoid fever in a citizen may be found from the fact that he drank water near the point of contamination, that some sixty other cases developed in that vicinity, that his habits were such as to tend to exclude another probable source, while his physician testified that such contamination was the source of his illness.

Canavan v. City of Mechanicsville 128 N. E. 882: A private water company or a municipality is not an insurer, nor liable as a guarantor, of the quality of the water it furnishes to its customers by the customary means of pipes and faucets, and cannot be held liable for injuries caused by impure water furnished by it, unless it knew or ought to have known of the impurity. Its duty is that of exercising reasonable and commensurate care and diligence in providing an adequate supply of wholesome water at all times.

In the case above cited, the Court decided that

A BETTER, STURDIER 1½-TON
Increased Earning Power



Demand for Graham Brothers 1½-Ton Truck increases steadily, rapidly. Owners profit by its economical, dependable work under all conditions of road and load. Buyers buy again. Fleets grow.

It has earned its preference by its earning power.

Now an improved 1½-Ton assures even greater value at the same low initial cost.

Graham Brothers consider a change an improvement, only when it adds definitely to the truck's value. These improvements do—

Seven-inch Frame—a sturdier chassis and longer truck life.

Steering Gear—greater ruggedness and easier handling.

Motor—recent improvements adding to its long life and dependable performance.

Shorter over-all Length—without reducing space for load.

Longer Brake Life—four brake bands, operated by service pedal, increase life of linings and drums.

Dodge Brothers Dealers everywhere will show you this better, sturdier Graham Brothers 1½-Ton Truck—and show you its capacity for work in your business.

Graham Brothers Trucks, with Dodge Brothers ¾-Ton Commercial Cars, meet 91% of all hauling requirements.

1½-TON CHASSIS $1245
2-TON CHASSIS 1445
(Disc Wheels With Dual Rear, Optional)
1-TON CHASSIS (G-BOY) 885
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GRAHAM BROTHERS TRUCKS

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the complaint stated a valid cause of action against the defendant city on account of typhoid fever contracted by plaintiff and his children from drinking impure water.

Roscoe v. City of Everett 239 Pacific 831: In discussing the case, the Court said: "It is sufficient to say that the evidence discloses that on April 11, 1923, a 6-inch main was laid to connect two laterals, and that when the connection was so made it permitted free circulation of water to the city users in the district served, and also better service to the Eclipse Mill Company. At the time this connection was made, there was a by-pass which had existed for a great many years. With the making of the connction there was no longer any need for the by-pass. This by-pass had in it what is known as a gate-valve A, a valve worked by hand, and which, when closed, effectually prevented water from passing through the pipe.....There was evidence that the city never inspected the valve in the by-pass from the date of its installation.....The ease with which the valve could be sealed or the by-pass removed, and the eminent danger to be apprehended by failure so to do, are strong factors in the question of the city's negligence." Award, $60,000.

Procedure for the Elimination of Cross-Connections, Etc.

To secure data in regard to policies being followed by different state boards of health, questionnaires were sent out, 31 replies being received. The questionnaire, with a summarization of the answers, is recorded below:

(1) Are cross-connections permitted between public water-supplies and polluted factory supplies in your state? If so, under what conditions?

(a)	All cross-connections prohibited	10
(b)	New cross-connections prohibited	6
(c)	No definite control	7
(d)	Permitted with double check-valves as protection	8
		31

(2) Are auxiliary intakes whereby a polluted supply may be utilized instead of the regular public supply in case of emergency, permitted? If so under what conditions?

(a)	Auxiliary intakes prohibited	12
(b)	Permitted when protected, as by removing a section of the pipe	12
(c)	Permitted on condition State Board of Health notified when used	5
(d)	Unanswered	2
		31

(3) Are by-passes whereby any important part of a water purification plant may be by-passed, thus discharging polluted water into a public water-supply, permitted? If so, under what conditions?

(a)	By-passes prohibited	17
(b)	Permitted with protection, as by removing a section of the pipe	10
(c)	No definite control	2
(d)	Unanswered	2
		31

(4) What are your rules and regulations or manner of enforcement in each of the above?

(a)	Definite regulations regarding cross-connections, auxiliary intakes, and by-passes	6
(b)	Definite regulations regarding cross-connections only	3
(c)	General control as matter of policy without specific regulations	5
(d)	Regulations for by-passes only	1
(e)	Have power to make, but have not enacted regulations	7
(f)	No regulations	9
		31

(5) What trouble have you experienced in the elimination of cross-connections, auxiliary intakes and by-passes in connection with the Underwriters Standards?

(a)	No trouble	17
(b)	Underwriters have objected to changes	4
(c)	No definite information	10
		31

In 1921 a similar questionnaire showed that three states had regulations prohibiting all cross-connections with a public water-supply, while in 1926 eight states have such regulations.

There is evidently a general movement by most states toward the elimination of cross-sections. In some instances all cross-connections are prohibited. In others, new cross-connections are prohibited, but those existing are permitted to remain, providing they are protected by double check-valves, and in some states double check-valves are permitted also on new installations. One state, New York, prohibits new cross-connections and has set a definite time for the complete elimination of all cross-connections.

It is an accepted opinion that all cross-connections, auxiliary intakes, and by-passes should ultimately be eliminated. The policy to be followed in bringing this about, however, depends largely upon local conditions, and the procedure must be determined by the individual states. The following procedure is suggested:

1. Adoption, publication, and distribution of regulations by the State Department of Health: (a) prohibiting new cross-connections; (b) requiring the elimination of all existing cross-connections as soon as possible.

2. A survey of all cross-connections with public water-supplies directly by the State Department of Health, if possible, or otherwise a survey by each municipality with definite reports back to the State Department.

3. A definite follow-up program by correspondence and inspection to see that regulations of the Department are carried out.

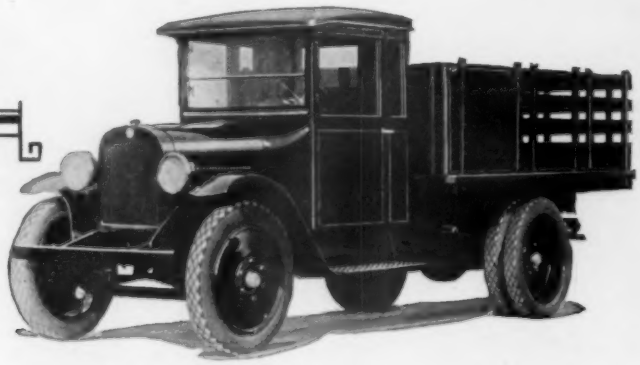
A TRAFFIC LABORATORY IN PARIS

A street in Paris is to be set aside as a traffic laboratory, in which will be conducted all sorts of tests for motor traffic to determine the causes of accidents. Various surface materials and safety devices will also be observed, as well as mistakes in driving and the most efficient control of traffic.

News!

Budd-Michelin Dual Wheels are optional equipment on Graham Brothers 2-Ton Truck

No extra charge!



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Budd-Michelin Dual Wheels and pneumatic tires add to the traction. They save the truck from the buffets of the road. They save the load. They save the driver. They assure the truck a longer and more widely useful life.

Every Dual-equipped Graham Brothers Truck joins an army of 60,000 trucks and buses which are getting 15,000 to 20,000 miles to a set of tires. That's *plus* value and *plus* service.

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Municipal Accounting and Finance

Conducted by Francis Oakey, C. P. A.

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The Information Required Respecting Expenditures

THE budget summary conveys information relating to the broad policies of financial administration. For example, it is an aid in determining such questions as the following:

1. Is the city living within its means?
2. Is an adequate portion of expenditures for additions and replacements of property being financed out of revenues?
3. Is due provision being made out of revenues to retire maturing debt, or is it the policy to refund?
4. Does the amount of interest on debt bear a reasonable relation to revenues? Are these charges increasing at a rate out of proportion to the increase in revenues?

Since the budget summary presents nothing more than totals for the city as a whole, it cannot convey information on which judgment may be reached as to the justification for expenditures. For this purpose supporting detailed statements are necessary.

The Main Problems to Which the Expenditure Statements Relate

Expenditure statements are difficult to prepare, because, in order to be satisfactory, they must serve as a basis for considering three of the most difficult problems in municipal finance, namely:

1. The policy of the scope of expenditure
2. The adequacy or inadequacy of expenditures
3. The economy of expenditures

The Facts Which Reflect the Policy of the Scope of Expenditures

The purpose of city government in this country is to maintain in a state of sufficiency those public services and public benefits which the citizens require. Although we hear a great deal about the control of the public purse by various "interests," it is a majority of the electorate, in the last analysis, which determines what the policy of expenditure shall be. It is only a question of whether the electorate considers a certain expenditure of sufficient importance to its welfare; if it does, it will come out and vote for or against it, the "interests" notwithstanding. Whether the city shall operate the water system or the street railway; whether an extensive park system shall be constructed and maintained—such questions as these the electorate determine.

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These responsibilities which the electorate takes unto itself must be reflected in the statements of expenditure. To do this, a summary of expenditures is required, classified by main functions, somewhat as follows:

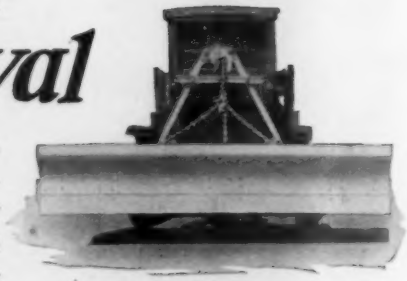
Electoral control
(Cost of elections)
Representative control
City Council
Administration
The Mayor's office
Finance
The Auditor's office
The Treasurer's office
The Board of Assessors
The Tax Collector's office
Administration of justice
The City Courts
Protection of persons and property
The Police Department
The Fire Department
Preservation of health and sanitation
The Department of Health
Provision and maintenance of streets
Provision and maintenance of sewers
Care of dependent and delinquent
The City Poorhouse
The City Prison
Education
Recreation
The Department of Parks and Playgrounds
Redemption of debt
Sinking Fund charges
Redemptions not provided for by Sinking Fund
Interest on debt

The foregoing list is intended to be merely illustrative; it is not presumed to be either complete or standard.

Keep down cost of snow removal

SPEED clears the highways before accumulation of snow multiplies the difficulty—and the cost. Speed means fewer hours of labor to pay for. Speed means more territory covered with the same amount of equipment. The new Good Roads Hi-Speed Snow Plow, Model 21-A, pictured above, can be operated at 20 miles an hour, clearing the road at one cut.

Traveling at top speed it throws snow well back from the road. Adjustable width—open for full cut, narrow for drifts and widening work. Either blade can be closed independently, an advantage in meeting traffic. Completely controlled without leaving driver's seat.



Here is Good Roads Blade Type Snow Plow Model 10-B, latest development of the original snow plow designed for use with motor equipment, built in 1913 to meet requirements of New York Street Cleaning Department. Today New York uses more than 2000 Good Roads Snow Plows.

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The purpose of such a statement is to reflect the amounts spent and proposed to be spent to support the main functions of government. To the right of such captions two main columns should be provided, the first to show the amounts expended in the previous year, and the second the amounts proposed to be spent in the coming year. Each main column should be divided into two sub-columns, one to show the expenditures for administration, operation and maintenance, and the other the expenditures for additions, betterments, and replacements of depreciating property. The footings of these columns should support the totals appearing in the budget summary.

This statement reflects the scope of expenditures, that is, the various main functions and activities which the city government is supporting. It also shows the amounts which are being spent in each main activity and the proportions which such amounts bear to the grand total. When the figures are compared for a period of years, the growth and tendency of the expenditure in each main function is indicated. Comparisons may also be made with cities approximately equal in population, not only as to main activities carried on, but also as to the cost thereof. Those of a statistical tendency may determine the amount of expenditure per capita for each function, but should be sure of their ground before drawing conclusions from comparisons of such figures.

Thus, such a statement is valuable for conveying a general understanding as to the policy of the scope of expenditures. It does not, however, carry information as to the adequacy or inadequacy of expenditures. For this, further details are necessary.

The Facts Which Reflect the Adequacy or Inadequacy of Expenditures

Assuming that the policy of the scope of expenditures is satisfactory, the next question is whether the amount expended on each main function is adequate or in excess of what is needed to perform the function in a state of sufficiency. For this purpose a series of supporting exhibits is necessary, including a statement of expenditures for each department or independent office.

Each of these statements should be classified to show the expenditure for each bureau or other departmental subdivision, and the expenditures for each bureau or subdivision should be further analyzed to show the amounts expended for each main class of services obtained or purchases made. To illustrate, let us take the Department of Health. This statement should be classified somewhat as follows:

Administration
- Salary of Commissioner
- Salaries of clerks
- Office supplies
- Printing and stationery
- Telephone and telegraph
- Miscellaneous

City Hospital

ADMINSTRATION
- Salary of Superintendent
- Salaries of clerks
- Office supplies
- Printing and stationery
- Telephone and telegraph
- Miscellaneous

WARDS
- Salaries of physicians and internes
- Salaries of nurses
- Wages of orderlies, domestics, and helpers
- Supplies and materials—medical and surgical supplies, other than drugs and medicines
- Drugs and medicines
- Cleaning and disinfecting
- Wearing apparel
- Miscellaneous

PHARMACY
- Salaries and wages
- Supplies and materials
- Miscellaneous

DOCTORS' AND NURSES' KITCHEN AND DINING-ROOM
- Salaries and wages
- Supplies and materials
- Provisions
- Cleaning
- Wearing apparel
- Miscellaneous

PATIENTS' KITCHEN AND DINING-ROOMS
(Classified in similar manner)

LAUNDRY
- Salaries and wages
- Supplies and materials
- Cleaning
- Wearing apparel
- Miscellaneous

The foregoing list is merely illustrative; it is not intended to be complete or to represent a standard classification. Other units might have to be added, such as Storehouse, Morgue, Housekeeping, Maintenance of Buildings and Grounds, Light, Heat and Power (if a power-plant were operated), etc.

To the right of these captions two columns would be provided, one to show the expenditures for Administration, Operation, and Maintenance for the previous year and the other for the coming year. Additions, betterments, and replacements of depreciating property should be shown in a separate statement in order that full details may be given as to the

Snow is easy, but— HOW ABOUT ICE?

LOOK AT THIS FEEDER—

Clear across and right down to the ground, —it cuts out in advance of the scraper;

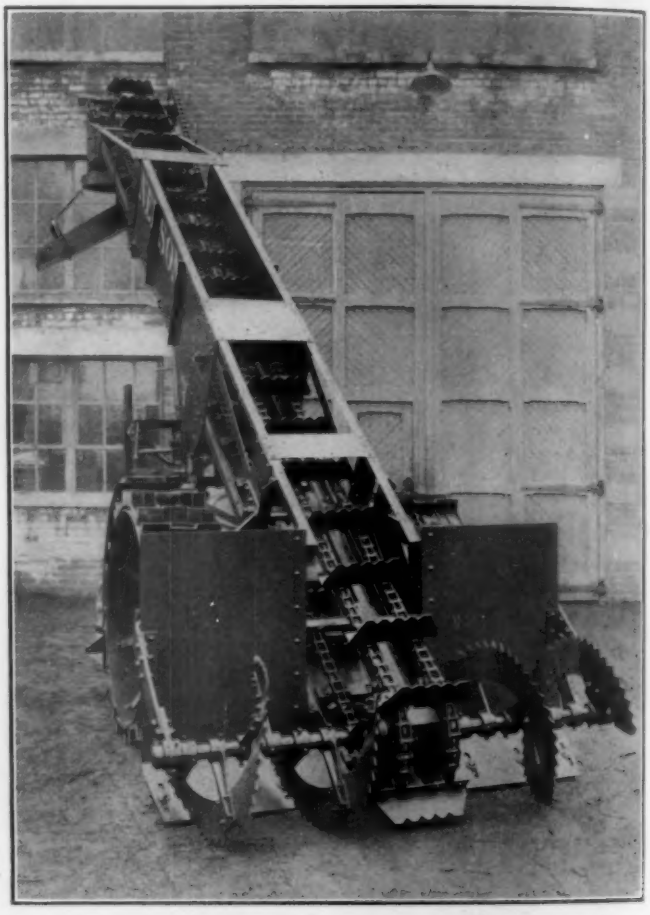
Ground ice, frozen to the pavement, cannot stop it;

It has clear, wide open delivery into the conveyor;

And it just GOBBLES UP the loose snow.

BUT—

After 48 hours or maybe sooner, when the snow is HALF ICE,



Other loaders may be put out of commission, while the NELSON SNOW LOADER HANDLES THE ICE JUST THE SAME AS SNOW.

No stalling, no shirking, no skimming the top, no dodging the hard spots,—it works day in and day out until the job is finished.

And that is the secret of our repeat orders.

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buildings purchased, constructed, or enlarged and the equipment purchased or replaced.

The amounts of the expenditures alone will not reflect adequacy or inadequacy. They must be related to statistics of capacity existing and required, so that the estimated cost of maintaining the required capacity may be arrived at and the extent of the inadequacy determined.

The Facts Needed to Determine Economy of Expenditure

In achieving and maintaining economy in expenditure, the effort consists of two main processes, namely:

1. The process of procurement
2. The process of application, consumption and conversion

Economy can be achieved and maintained only when both processes are directed and carried on without extravagance or waste and are coordinated one with the other.

The process of procurement includes the selection and hiring of employees, the making of contracts for services other than personal, and the purchase of supplies, materials, equipment, and other property of a permanent character.

The process of application, consumption, and conversion includes the application of labor to the work to be done, the consumption of supplies in operation, the conversion of materials in construction or production, and the use and care of equipment and other property of a permanent character.

The final test of the economy of these main processes is the cost of the results attained expressed in comparable terms, and the comparison of these costs with those which are considered normal. The cost per square yard of laying a certain section of pavement must be determined and compared with the normal cost of pavement of that particular kind and grade. The cost per cubic yard of the construction of a building must be determined and compared with the normal cost of similar buildings. The cost of supplying each thousand cubic feet of water must be compared with a cost which has been found to be normal under similar conditions.

The Need for an Unbiased Presentation of Facts

The purpose of all reports or statements relating to the finances of a city should be to convey the facts needed for the guidance of the administration and for the judgment of the electorate. There should be no argument in a statement, no attempt at concealment or justification of what has been done or what is proposed. The administration should present its arguments in speeches and texts. The right kind of statement consists of an uncolored, complete, and accurate enumeration of the facts, expressed in the clearest possible language.

Unfortunately, there are many processes in the operations of a city government which are not susceptible to comparison by means of unit costs. For example, there are no unit costs which can be applied to the Police Department or the Fire Department. But in such cases we can at least compare the salaries paid, the prices paid for equipment, the kind of equipment used, etc., and can ascertain the cause of large variations in the relation of the number of such employees to population.

In the departmental statements of expenditure, unit costs should be introduced in relation to all operations or processes which can be truly measured by such units. A cost unit which is a true measurement is one which does not vary as to the amount of labor and material which it represents. Examples of such units are—one thousand cubic feet of water delivered to the consumer, and one square yard of pavement laid. Examples of units which are not true measurements of cost are—the cost per fire put out, and the cost per arrest made.

The Need for Standard Classification and Nomenclature

A statement of expenditures fails of its purpose unless it conveys an exact understanding of the scope and content of every item. To accomplish this end, standard titles and captions must be used and the content of each defined. Once the standard is adopted, there must be no variation without explanation. Not only must the language be clear and conform to the best usage, but the titles and captions must be given official recognition. Finally, the arrangement and order of titles and captions must be standard. Without such standardization valuable comparisons are impossible.

The Need for Effective Statements of Expenditures in Granting Appropriations

The granting of appropriations by the legislative body is often a haphazard process on account of a lack of knowledge of the facts. The executive often asks for an appropriation which he cannot justify by a clear and complete presentation of past expenditures and future requirements. So the legislative body arbitrarily fixes an amount after a process re-

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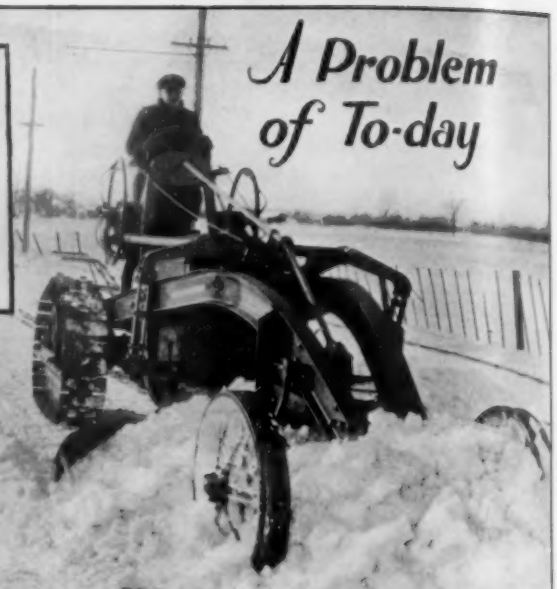

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Why take chances? The only way to know a good snow plow is by the past performance. Hundreds of Baker Snow Plows are purchased every year because of the good work they did the winter before. Attach good snow plows to your trucks or tractors. Baker Snow Plows are that kind.

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sembling trading. Of course, when such methods are followed, it is only a coincidence if the right amount is appropriated. The result is either extravagance or failure to maintain needed services in a state of sufficiency. It is not too much to say that the act of granting an appropriation cannot be faithfully discharged unless it is based on a thorough understanding of a complete and accurate statement of expenditure.

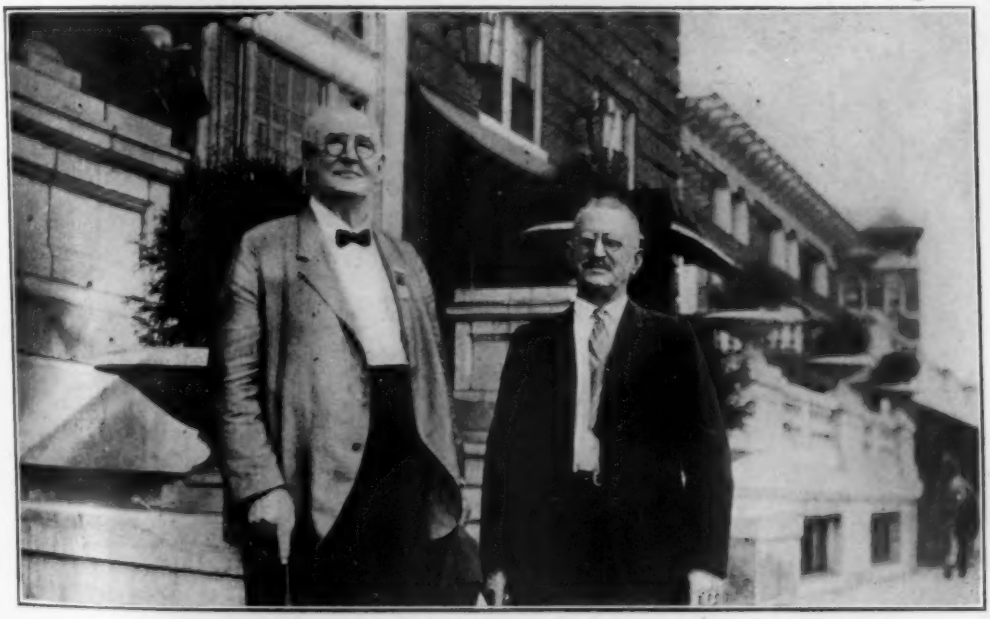
Thirty-first Annual Convention of International Association of Municipal Electricians Had Two Charter Members in Attendance

IN addition to a worth-while program and elaborate exhibits, distinction was given to the annual meeting of the International Association of Municipal Electricians, held in Asheville, N. C., September 21 to 24, by the presence of two charter members of this 31-year-old organization. Younger members from all over the country were in attendance and great interest was displayed. The exhibits showed traffic signals, police signals, fire-alarm equipment, wires and cables, and other electrical apparatus used by municipalities. Salt Lake City, Utah, was selected as the meeting-place of the Association's annual convention for next year.

Through the courtesy of Daniel J. Morgan, Sales Engineer of the Hazard Manufacturing Company, of Wilkes-Barre, Pa., THE AMERICAN CITY presents the accompanying picture and the following sketches of "Uncle Bill" and "Billy."

Will Y. Ellett, Superintendent of Fire-Alarm, Elmira, N. Y., was born in that city July 12, 1852, and in September rounded out his 42nd year as Superintendent of Fire-Alarm in his home town. He is a charter member and one of the organizers of the International Association of Municipal Electricians and has attended every meeting of this organization except one. This he was unable to attend because of an accident due to falling from a pole. Uncle Bill, as he is affectionately called, is a past president and very active and takes a deep interest in Association matters, serving on the important committees. He is redheaded, is 6 feet 2 inches tall, and weighs 250 pounds. The members of the Association presented Uncle Bill with a beautiful cane suitably inscribed at the closing banquet of the Asheville meeting.

William Crane, City Electrician, Erie, Pa., was born in that city 60 years ago. He was appointed Superintendent of Fire-Alarm November 10, 1891, and hasn't missed a day of service. Mr. Crane has been deeply interested in the affairs of the International Association of Municipal Electricians and has served as its Treasurer and also on the Executive Committee. Billy Crane in his younger days was one of the champion long-distance bicycle racers and won many prizes. Billy, like Uncle Bill Ellett, is redheaded, but cannot claim the height or avoirdupois that his brother charter member does.



TWO CHARTER MEMBERS OF THE I. A. OF M. E. IN ATTENDANCE AT THE ASHEVILLE CONVENTION, SEPTEMBER, 1926

William Y. Ellett, Superintendent Fire-Alarm, Elmira, N. Y., (at left), and William Crane, City Selectman, Erie, Pa.

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A "Caterpillar" Tractor hitched to a heavy piece of modern road machinery—the outfit challenges a rocky road! Something has to yield!

Not the "Caterpillar," it grips the ground too surely! Not the implement—it was designed to match "Caterpillar" power!

Mother Earth bows to a superior force! Rocks move aside—a new road surface follows the wake of the "Caterpillar" drawn outfit!

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Reducing Tax Delinquency

Figures and Suggestions from a Recent Bulletin of the Bureau of Municipal Research of Philadelphia

THE amount of uncollected or delinquent taxes at the end of a city's tax-collecting period affords an indication of the efficiency of the tax-collecting system and a means of making a rough comparison with other cities.

It would be a mistake, of course, to claim too much for such a comparison. General business conditions, the habits of the population with regard to paying taxes, and the distribution of property-ownership are a few of the important factors which influence tax collections, and yet are entirely beyond the control of the public officials. If, however, we find that the tax-collecting systems in those cities which have the lowest delinquency rate seem to have certain common features, we may fairly assume that these characteristics are favorable to a low delinquency rate.

Rates of Tax Delinquency

The comparisons which follow are based upon information given in answer to the questionnaire recently sent by the Philadelphia Bureau of Municipal Research to the large cities of the United States and Canada. Twenty-four cities, including 21 of the 25 largest in this country, gave figures showing the extent of tax delinquency at the close of the last tax-collecting period. With these figures, rates of tax delinquency were computed, the rate of delinquency being the percentage of the tax levy uncollected at the close of the tax-collecting period.

The 24 cities with their delinquency rates are as follows:

Minneapolis ...	0.51%	Philadelphia ..	5.97%
San Francisco..	0.71%	Baltimore	7.29%
Detroit	0.99%	Vancouver	7.39%
Los Angeles...	1.70%	Columbus	7.52%
Duiuth	1.74%	New Orleans ..	8.00%
Buffalo	1.81%	Kansas City, Mo.	9.67%
Seattle	2.43%	New York	10.60%
Indianapolis ...	2.47%	Pittsburgh	11.06%
Rochester	2.85%	Boston	11.15%
Denver	3.21%	St. Louis.....	13.14%
Portland, Ore..	3.67%	Washington, D. C.	16.26%
Harrisburg ...	3.95%		
Cleveland	5.48%		

Possible Reasons for Difference in Rates

In order to discover, if possible, whether there is any relation between the delinquency rates and certain provisions in the tax-collecting systems, let us divide the 24 cities into two equal groups, with the 12 having the lowest delinquency rates in one group, and the rest in the other group. In the first group, 10 cities permit payment of taxes in instalments, whereas, in the second group only 7 permit such payment. We find, furthermore, that in 8 of the first group of 12 cities tax bills are mailed to the taxpayers, whereas, of the cities in the second group, only 4 render that service. Conclusions from these facts must of course be guarded, but if the facts indicate anything, it is that instalment payment and sending of tax bills increase the chance of a low delinquency rate.

Only 2 cities in the first group allow discounts, whereas 6 cities in the second group allow them. One would hardly contend that the discounts increase delinquency in the second group, but apparently they do not discourage it.

Penalties Imposed

Penalties are imposed for the non-payment of taxes in all 24 cities. However, those cities which impose a relatively high penalty as soon as the tax becomes delinquent seem to predominate at the head of the list. For example, San Francisco and Los Angeles, occupying second and fourth places, respectively, impose penalties of 15 per cent upon the first instalment as soon as it becomes overdue, and 5 per cent on the second when it becomes overdue, together with an additional 5 per cent on the first if unpaid at that time. Minneapolis and Duluth, in the first and fifth places, impose penalties of 5 per cent plus 1 per cent per month interest on the first instalment, and 10 per cent upon the second. Indianapolis, in eighth place, imposes 10 per cent upon the entire tax if the first instalment becomes delinquent.

Conclusions

The experience of the 24 cities named above seems to indicate that a system of tax collection providing for (1) instalment payment of taxes, (2) heavier penalties upon taxes as soon as they become delinquent, and (3) mailing of tax bills to property owners is a combination strongly tending to reduce delinquency.

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Ease of Installation

No backing board is needed for installation of the new Servicised Metal Edge Expansion Joint. It has sufficient rigidity, provided by the flat metal strips, to keep it in close contact with the slab when properly staked in position, and the new batch can safely be poured right up against the filler. The metal strip at the bottom prevents joint sagging into irregular subgrade.

The metal base remains attached to the joint, assuring vertical and straight installation and preventing flaring at the base; it in no way interferes with the proper functioning of the joint. The metal edge on the crown of the filler prevents a wavy line and laying over of the top of the joint. After installation it can be peeled off as easily as a banana skin.

This trademark, found on all Servicised Products, is the symbol of careful workmanship and sincere endeavor. It is a guarantee that Servicised Products are made right, sold right and will function right. Look for the trademark on all our products.

Introduced only a month or so ago the new Servicised Metal Edge Expansion Joint already has won widespread recognition and is rapidly earning the regard of everyone interested in better road building.

For it makes installation easy and accurate and remains as a permanent functioning unit in the pavement. It has sufficient rigidity to eliminate the use of backing board in installation, it cannot flop out of alignment, and while it has the necessary plasticity and resiliency to meet the contraction and expansion of the slabs, it will not ooze out on the pavement and wear away. It offers maximum resistance against the working in of pebbles or other foreign substances.

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Items of Civic Interest

Dallas County Has a Cleanest Town Contest

RICHARDSON is the cleanest town in Dallas County, Texas, according to the decision reached by a committee from the Dallas Technical Club, appointed to make inspections of all towns entering the "cleanest town" contest in Dallas County. Towns entering the contest were Richardson, Garland, Mesquite, Lancaster, Grand Prairie and Irving.

As reported in *Texas Municipalities*, keen competition featured the contest throughout, resulting in a material improvement of sanitary conditions. Civic and business clubs, Boy Scouts and school children cooperated with city officials in their fight on dirt and disease germs, and their combined activities were so effective that the committee stated that they found it difficult to decide which town had the most sanitary appearance. The factor that contributed most to the lower grades of other towns was the insanitary condition on the inside of a few business establishments.

Basis for Sanitary Rating

A definite scoring system was used by the judging committee in making their awards, the following things being taken into account:

The disposal of trash and garbage
Condition of privies and toilets
Fire hazards
Elimination of mosquito and fly breeding places
Drainage ditches
Disposal of junk from garages
Freedom of streets and alleys from trash and weeds
Cleanliness of cafes, restaurants, markets, drug stores and hotels
Dairy sanitation

Country School District Has Open-Air Theater

BY taking advantage of a natural amphitheater in a maple grove, the Hopson school district community in Herkimer County, New York, has provided itself with a successful out-of-door theater with practically no outlay of money, says the *Extension Service News* of the New York State College of Agriculture at Cornell University.

The theater is just back of the schoolhouse, where the gentle slope of the ground provides the equivalent of tiered seats for the audience. The stage is a piece of ground levelled and held with a retaining wall of stone. The trees at the back of the stage are thick enough to serve as a drop curtain and the wings, originally made of composition board, are now screens of chicken wire woven with branches of trees to make the whole set like a part of the grove.

For the performances the stone retaining wall is partially concealed with flowers, ferns, branches, or whatever suits the character of the play. Branches also conceal the row of footlights along the top of the wall. Little scenery is needed; but an artist in the community paints composition board when houses, fences, and the like are required. In addition, the same person supervises the making of costumes and the settings for the plays.

The outdoor theater has been developed through the cooperation of the community at large, with the able assistance of the district superintendent, E. S. Hopson, and the school teacher, Mary Mang. Since the theater was established in 1923, plays have been given by children annually at the close of school, and at various other times by both adults and children.

Ice Cream as a Cause of Epidemics

IT has been demonstrated by several investigators that exposure to the temperatures used in freezing and storing ice cream cannot be relied upon to kill all pathogenic bacteria that may be present.

Numerous outbreaks of disease, such as typhoid fever, diphtheria, scarlet fever, diarrhoea, and intestinal disturbances, have been definitely traced to contaminated ice cream.

It is believed that the same sanitary precautions should be taken by health officers, and state and city boards of health in protecting the ice cream supply as are taken with the milk supply.

Three safeguards are suggested:

1. Pasteurizing the ice cream mix at 150° F. for 30 minutes
2. Establishing a bacteriological standard 100,000 bacteria (colonies) per gram
3. Regular sanitary inspection of ice cream plants

The foregoing are the conclusions of a paper on "Ice Cream as a Cause of Epidemics," by Frederick W. Fabian, Associate Professor of Bacteriology and Hygiene, Michigan Agricultural Experiment Station, East Lansing, Mich., published in the *American Journal of Public Health* for September, 1926. The paper contains forty-four references to articles in health department reports and other publications.

Sanitary Handling of Ice

SANITARY handling of ice is as important a public health safeguard as the use of safe water in its manufacture, according to Dr. H. O. Sappington, State Health Officer of Texas. "The State Board of Health," says Dr. Sappington, as quoted in *Texas Municipalities*, "is making a sanitary survey of ice manufacturing plants in the state for the purpose of raising sanitary standards of ice manufacturing and distribution.

"Reports from this survey so far received indicate that a large proportion of plants inspected meet minimum requirements prescribed by the State Board of Health. Splendid cooperation has been received in this work from ice manufacturers, and many suggested improvements and corrections have been secured where sanitary conditions were found unsatisfactory. As soon as the survey is complete, a list of approved manufacturing plants will be available for publication."

Finds Kelly Kats are economical tires

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Hauling Contractor
Asheville, N.C.

January 20, 1926.

Southern Dray Co.,
City.

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I have been using Kelly Kats on my fleet of White trucks for a number of years and feel that I am in position to know about the merits of your tire.

I find that they are the most economical tires I can use. They deliver more miles and furnish much better traction than any tire I have ever used.

I cannot recommend them too highly and you may be assured that I shall continue to use Kellys only.

Yours truly,

L. H. Hudson

The durability of Kelly Kat tires is not the only reason they are economical. The traction afforded by the side vents that Kelly originated and perfected, gives Kats a hold on any kind of road and enables them to carry their loads through just as long as the engine will function.

And the resiliency of Kelly Kats protects the truck and its engine from the terrific jolts of rough roads.

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Reduced Rates for Long Distance Telephoning

Reductions on basic telephone toll rates for 110 miles or more and general readjustments of reduced rates at night are provided by the new interstate long distance schedule made effective October 1 on Bell telephone systems throughout the country. The new schedule will mean an annual saving of $3,000,000 to telephone users of the country.

Reduced rate hours for station-to-station calls now begin at 7 P. M. instead of 8:30 P. M. Between 7 and 8:30 P. M. the discount is 25 per cent of the day station-to-station rates. From 8:30 P. M. to 4:30 A. M. the discount is about 50 per cent of the day rates, applying where the day station-to-station rate is 40 cents or more, with a minimum reduced rate of 35 cents.

All rates from 8:30 P. M. to 12 midnight to points 110 miles or more away are lower. From midnight to 4:30 A. M. the old rate is increased, on account of the reduction of the 75 per cent discount to 50 per cent. The 50 per cent discount is applied to a lower basic rate than was the 75 per cent discount.

For example, under the new schedule the day rate from New York to Boston is reduced from $1.25 to $1.15; the rate between 7 P. M. and 8:30 P. M., from $1.25 to 85 cents; the rate from 8:30 P. M. to 12 midnight, from 85 cents to 65 cents; and the rate from 12 o'clock to 4:30 A. M. is increased from 35 cents to 60 cents. The basic rate from New York to Pittsburgh is now $1.70 instead of $2.10; to Chicago, $3.40 instead of $4.65; to Denver, $7.25 instead of $10.40; and to San Francisco, $11.30 instead of $16.50.

No changes are made in the schedule for calls within New York or New Jersey or for calls between points in the separate states less than 40 miles apart. For points in separate states between 40 and 110 miles distant the rates are slightly higher than formerly, the maximum increase being 5 cents in the basic station-to-station schedule and from 5 to 15 cents on person-to-person business. The privilege of reversing charges has been extended to interstate calls.

$50,000,000 Water Plant for Detroit

DETROIT, MICH.—Construction is to be started this fall on a new water plant for Detroit, to cost $50,000,000. Seven million dollars of this are required for a 10-mile tunnel across Detroit from east to west, through which the water will flow by gravity in a great underground river.

Heretofore the entire city has been supplied from a single station located above Belle Isle, the water being distributed thence through the mains, with serious loss of pressure at distant points. The resultant fire menace has been given serious consideration and the tunnel plan is the result.

Detroit's water problem is complicated by the fact that many of the suburban municipalities look to it for their supply, purchased from the Detroit Water Department. Outside municipalities with their own water plants based on deep wells are facing an exhaustion of their supplies, owing to the steady sinking of the subterranean water-level under this constant pumping, and will soon have to come to Detroit for aid. This and the steady growth of the Detroit urban population makes the extension imperative.

A bond issue of $30,000,000 toward the cost of constructing the new system will be voted upon at the November election. The rest will come from earnings of the Water Department, estimated at $27,000,000 in the next ten years.

Berlin Studies American Traffic and Transportation Methods

Dr. Leonhard Adler, member of the City Council and Commissioner of local traffic in Berlin, Germany, has been making a tour of a number of the principal cities of this country. The Berlin municipality, through stock ownership, controls the company operating all the street railways in Berlin, and it has recently also taken over the bus, elevated, and subway services. The problem of coordination of these services so as best to provide for the local traffic needs of Berlin has therefore become a very active problem in that city. It was largely to study American methods along this line that Dr. Adler came to the United States. During his trip he visited New York, Detroit, Chicago, Washington, and Philadelphia, among other cities, and declared shortly before sailing that his visit had been very helpful on his problems.

In one important respect, Dr. Adler said, traffic conditions in Berlin differ from those in this country. There is nowhere near the number of private automobiles on the streets. The total registration of private automobiles in Berlin is only 48,000, although the city has a population approximating 3,000,000. This difference can be explained by the higher first cost and higher operating expenses of cars in Germany, as well as by the lower average income of its inhabitants. Thus, while in the United States a new automobile of good make can be purchased by a workman for a price equivalent to about two months' wages, it would take a German workman two years to earn the price of a

Longview, Washington, has 800,000 square yards of Concrete Streets

Concrete streets *paved the way*

HUNDREDS of cities have found concrete streets one of the best investments they ever made. An outstanding example is Longview, Washington.

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Columbus	Jacksonville	Nashville	Portland Oreg.	Vancouver, B. C
Dallas	Kansas City	New Orleans	Richmond, Va.	Washington, D. C
		New York		

corresponding car. Gasoline retails for about 45 cents a gallon in Germany.

Dr. Adler said that while a number of busses were in use in Berlin, the street cars were being depended on to carry the bulk of the traffic. He thought this condition would continue on account of the much lower operating cost per passenger by the cars. Among recent developments on the street railway system, Dr. Adler spoke of new light-weight cars; also of recent car-house construction in which the car-house is in the center of a block, and apartment buildings for the train service men on the street frontage. This is a great convenience of them and a help to the company.

A "Don't Get Hurt" Campaign

HAMPTON, VA.—The Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., is now conducting a "Don't get hurt" campaign which is distinctly educational. The object is to spur the patrons of the road, as well as the conductors and motormen, to exercise such care as is necessary to prevent accidents. It is said that no other railway in the state has a more careful group of conductors and motormen than the company which serves the Lower Peninsula. However, the people at large are urged to learn the great lesson of self-reliance as a prerequisite to self-protection, and that is the lesson which the promoters of the "Don't get hurt" campaign hope to teach to the patrons and operators.

Low Rate Tickets for School Children

PINE BLUFF, ARK.—The Pine Bluff Company, through its Manager recently announced that street-car tickets in books of 20 for 50 cents per book, or at the rate of 2½ cents per trip, are being issued for the use of school children. Use of these tickets is restricted to children attending public and private grammar and high schools, and are good any time between the hours of 7 A. M. and 6 P. M.

Joplin Returns to the 5-Cent Fare

JOPLIN, MO.—Almost a 6 to 1 majority in favor of the proposal of the Southwest Missouri Railroad for exclusive handling of Joplin's public transportation by street car with a return to the 5-cent fare was given by the voters of that city in a special election recently. A counter proposal to return to busses was defeated by an equally substantial vote. The return to the 5-cent fare was made effective at once.

While a return to the 5-cent fare is made in Joplin, the railroad has not considered a reduction of the intercity rate. The intercity rate increase was obtained solely because of the 8-cent fare in the Joplin city zone.

Monorail System Being Investigated

PORT HURON, MICH.—Thirteen men, appointed by the City Commission, will investigate, in conjunction with the Commission, and report on the proposed construction through Port Huron of a monorail railway system. F. J. Potter, consulting engineer of the Rapid Transit Corporation of America, a Delaware concern, addressed the Commission recently in an effort to obtain the sanction of the city for a right of way through the city. The company has ambitious plans to construct a belt line monorail system connecting Port Huron and Detroit, Lansing, Saginaw, Bay City, Grand Rapids, and other Michigan cities with Chicago and Toledo.

Artesian Wells Proposed to Aid New York's Water-Supply

NEW YORK CITY.—A proposal to increase the present Catskill and Croton watershed water-supply to New York City fifty per cent at a cost not to exceed $10,000,000, has been received by Mayor Walker and turned over by him to the Department of Water Supply, Gas and Electricity. The proposal is for the drilling of artesian wells on Long Island. The water thus obtained would supply Queens and parts of Brooklyn. The Mayor turned the proposal over to Deputy Chief Engineer William W. Brush of the Department of Water Supply, at a meeting of the Board of Estimate. Mr. Brush assured him of an early study of its terms.

Lower Gas Rates for St. Louis County

ST. LOUIS COUNTY, MO.—A reduction of about 10 per cent in the gas rate in St. Louis County has been agreed upon by the St. Louis County Gas Company and members of the St. Louis County League of Municipalities, an organization composed of officials of all municipalities in the county. The present rate in St. Louis County is $1.15 per 1,000 cubic feet, with a 5 per cent discount if paid in ten days. The new rate will be $1.05 per 1,000 cubic feet, with a 5 per cent discount if paid in ten days, making the rate in reality only 99¼ cents per 1,000 cubic feet if paid in ten days. This is less than the rate in St. Louis, where $1 per 1,000 cubic feet is charged, with no discount and a penalty of 10 per cent for delinquent payment. The new rate will be formally agreed upon and then will be submitted to the Public Service Commission for approval. The new rate was decided upon after the company's books had been opened to the League of Municipalities for its annual inspection.

Municipal Electric Light Revenues in California

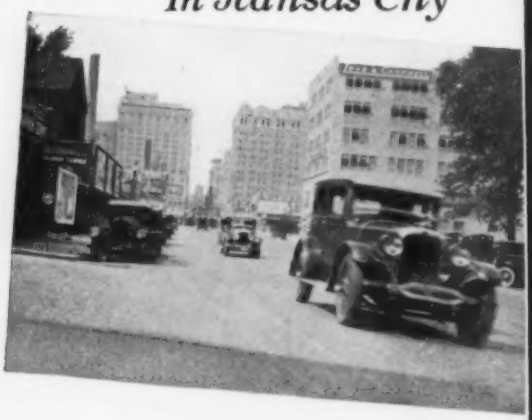
CALIFORNIA.—The 22 municipally owned electric light plants in California did a $13,000,000 business last year at a profit of about $3,666,000. This was revealed in the annual report of municipal and county financial transactions made public by State Controller Riley. Total ordinary receipts of the 22 municipal plants aggregated $12,986,000, while the 1925 expenditures, including interest and redemption of bonds, administration and collection expenses, operating and maintenance expense, purchase of current and other ordinary expenses amounted to $9,319,999. An aggregate of $1,878,506, derived either from operating revenue or sale of bonds, was invested in plant improvements. Deposits made by consumers totaled $181,922 and deposits refunded $121,315.

Only six of the 22 municipalities in the electric light business generate their own current. They are: Los Angeles, Pasadena, Alameda, Riverside, Palo Alto, and Avalon. The others, which buy electricity wholesale and retail it to consumers, are Glendale, Anaheim, Santa Clara, Lodi, Roseville, Colton, Burbank, Redding, Azuan, Healdsburg, Ukiah, Lompoc, Banning, Gridley, Biggs, and Tehachapi.

By far the largest of the municipal dealers in light and power is Los Angeles, where the revenue

In California

In Kansas City



In Mississippi

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THE Vibrolithic METHOD

Write for Booklet A 11

American Vibrolithic Corporation
INSURANCE EXCHANGE BUILDING DES MOINES, IOWA

last year totaled $9,209,101 as against expenses of $7,105,260. Consumers there at the end of the fiscal year numbered 207,746 and the plant and system were valued at $39,256,861. At the other extreme is Biggs with 160 consumers and less than $11,000 capital invested. This municipality's revenue last year totaled $5,765 as against expenses of $3,999.

Papers on the Basis of Rate-Making Available

Three papers on the subject of reproduction cost versus actual cost as the basis for valuation in rate-making, have been prepared for publication by Dr. John Bauer, one of the members of the American Public Utilities Bureaus. One of these papers, entitled "Rate Base for Effective and Non-Speculative Railroad and Utility Regulation," is now ready for distribution. Copies of this study will be sent by the Bureau to any one interested. The other two papers are in the course of publication and will be announced in this department in later issues.

Painesville to Retain Ownership of Light Plant

PAINESVILLE, OHIO.—The proposed sale of the municipal light plant of Painesville, Ohio, to the Cleveland Electric Illuminating Company for $765,000 was recently defeated by vote of the City Council. City Solicitor W. H. Hubbard, according to the Painesville *Telegraph*, had estimated the net profit of the plant for the year 1926, based on the earnings for the first eight months, at $124,000. Mr. Hubbard's estimate takes into consideration everything except depreciation. Light plant bonds to the amount of $265,000 are outstanding.

The municipal light plant furnishes, without cost to the city, all the current required for street lighting, which, at public utility estimates, represents a saving to the municipality of $18,000 per year.

The municipal water-works on the lake front, which was rebuilt in 1925 and is electrically operated, is connected to the municipal light plant by a 6,600-volt transmission line 3½ miles long. The filter capacity of the water-works is six 750,000-gallon-per-day filters; the pumping capacity is 9,000,000 gallons per day. A staff of four men—one man per shift and one relief man—is required to operate the water-works.

Hadlow, Hicks & Company, of Cleveland, were the engineers of both the light plant and the water-works.

Financial Plan Desirable for Municipalities

MUNICIPAL officials are fast coming to realize the importance of a carefully planned financial structure. Until comparatively recently but few cities planned physical developments for more than a limited period. Then became apparent the desirability and need for intelligent thought of future growth. Schools, sewers, parks, paving, water and fire protection needs must be anticipated for decades. This work is usually in the hands of men with vision and adequate technical training. The city's financial program should be worked out in a manner consistent with its physical growth.

In the past as funds were needed, bonds were usually sold with maturities most desirable to bankers. Many times it later developed that such maturity dates were burdensome or that the original tax levy accumulated funds that must lie idle in the municipal treasury until bonds matured years later.

A municipal banking-house can render a great service to growing cities. There are several large institutions that specialize in this service, and the day is coming, if it is not already at hand, when every municipality will have chosen an investment banker to supervise the city's borrowing policy. No man or group of men can foresee American development, but a financial structure can be devised that has sufficient flexibility to be adaptable to changing needs.

—H. M. BUCHER, Manager of Buying Department, C. W. McNear & Company, of Chicago and New York.

The Municipal Bond Market

By Sanders Shanks, Jr.

Editor, *The Bond Buyer*

DURING the month of October the municipal bond market witnessed a dull period. Issues floated during the month were sold at a greater interest cost to the borrowing communities than they have been obliged to pay for recent issues.

The state of Pennsylvania offered $10,000,000 4 per cent bonds. On the day scheduled for the sale, only $6,000,000 were sold at a price of about par. Later the remainder was disposed of to various parties. There was no bid received for the entire issue. The city of St. Louis, Mo., issued $6,000,000 4's at a net interest cost of 4.18 per cent. Philadelphia will offer $25,000,000 4¼'s on a date following that of this writing. Few other high-grade issues were offered for sale, as indicated by the subjoined list of important offerings:

Amount	Issue	Maturity	Rate %	Yield %
$ 3,922,000	Boston, Mass	1927–1971	4	3.99
10,000,000	State of Pennsylvania	1934–1954	4	*4.00
500,000	State of Colorado	1933–1945	5	4.17
6,000,000	St. Louis, Mo	1931–1946	4	4.18
850,000	Reading, Pa	1926–1946	4¼	4.19
400,000	Cambria Co., Pa	1926–1949	4¼	4.24
2,034,000	Grand Rapids, Mich	1927–1953	4¼	4.24
559,000	Plainfield, N. J	1927–1956	4½	4.37
1,500,000	Dayton, O., Sch. Dist.	1927–1950	4½	4.40
1,365,000	Atlantic City, N. J	1927–1966	4½	4.41
820,000	Springwells Tp., Mich. Unit Sch. Dist	1956	4¾	4.55
500,000	Hinds Co., Miss	1927–1951	4¾	4.68
1,463,000	Houston, Texas Ind. Sch. Dist	1931–1941	5	4.70
390,000	West New York, N. J.	1927–1943	5	4.81
350,000	New Mexico	1927–1928	5	4.87
580,000	Orlando, Fla	1927–1946	5	5.64

* About.

Thinner brick pavements

THE argument is over. All question of doubt as to the relative endurance of pavements built of 2, 2½ and 3-inch brick as compared with those of the thicker and more costly 3½ and 4-inch brick is cleared away by the exhaustive Arlington Test.

Let us send you a complete copy of the official Arlington performance figures. They introduce a new era in paving practice.

VITRIFIED Brick

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

Statutory Authority to Operate Street Railways Does Not Authorize Bus Lines

In the case of Woodward vs. City of Seattle, 248 Pacific Reporter, 73, the Washington Supreme Court decided that defendant city was not liable for injury caused in the operation of a motor-bus operated in connection with the city-owned street railway system, because operation of motor-busses was not authorized by the city's charter. This does not necessarily mean that an individual or private corporation could avoid liability for accidents caused by his or its employees on the ground that the individual or private corporation was unauthorizedly operating busses. The decision is confined to the principle that a city is not liable for acts resulting from its officials engaging in unauthorized activities. But the following language of the Court is interesting as indicating that neither a private nor a public corporation can legally operate motor-busses under charter power to operate railways:

"The power granted by the statute is restricted to railways; and to say that the term 'railways' may be construed to include motor-bus routes is to say that the term also includes all manner of transportation, including that by water and by air. It is common knowledge that for many years street-railway systems have been operated without the operation of motor-busses in connection, and this is conclusive that such operation is not indispensable."

Private Water Company Does Not Enjoy Municipality's Immunity from Liability for Neglect to Furnish Proper Water-Supply for Fire Protection

That a city enjoys immunity from liability for negligence committed in a governmental capacity does not enable it to transmit the immunity to a private corporation with which a contract is made for furnishing a water-supply for fire protection or for furnishing other public service. And, under the statutes of New York, a water company may be held liable to a resident and taxpayer whose property burns through the company's failure to provide a fire-hydrant water-supply contracted for with the city. Reaching these conclusions in the case of H. R. Moch Company vs. Rensselaer Water Company, 217 New York Supplement, 426, the New York Supreme Court for Albany County said, in the course of an extended opinion in which many judicial precedents were reviewed:

"Contracts of public service corporations made with municipalities are made in the interest of individuals and for their benefit. This would be true of a contract with a lighting company for furnishing street lights, as well as fixing the rates to be charged consumers. This would be true of a contract with a street railroad requiring it to maintain certain portions of the street pavement, as well as fixing the rate of fares, and is equally true of a contract with a water company providing for the maintenance of hydrants for protection, as well as the fixing of the rate for water consumption by inhabitants."

Validity of Municipal Regulation of Interurban Busses

An ordinance of the city of Pine Bluff, Ark., forbids stopping of motor-busses in the city to take on or discharge passengers, excepting at certain stations. The Arkansas Traveler Bus Company was fined for violating the ordinance. On appeal to the Circuit Court of the county, the Court decided that the ordinance was void as conflicting with the powers of the Arkansas Railroad Commission. But on a further appeal, taken by the city to the Supreme Court of the state, it was ruled that the ordinance is valid. Said the Supreme Court:

"The Arkansas Railroad Commission was established, among other things, for the purpose of regulating motor-busses; but there is no inconsistency between its powers and the power given cities to control their streets. Indeed, one of the rules of the Arkansas Railroad Commission provides for the loading and unloading of passengers of public busses operating as common carriers at only privately owned depots in the cities and towns requiring it by valid ordinances." (City of Pine Bluff vs. Arkansas Traveler Bus Company, 285 Southwestern Reporter, 375.)

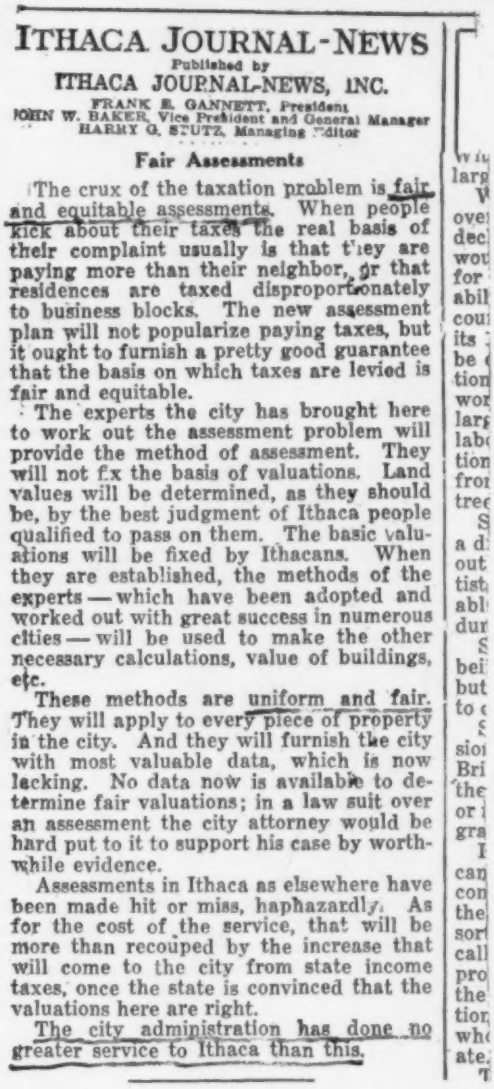
Municipal Action Toward Erection of a Viaduct Upheld

The city of Knoxville, Tenn., instituted proceedings for construction of a viaduct over the Southern Railway Company's tracks for street purposes. This involved closing the end of a street, and two taxpayers sued to enjoin the project, but their suit was ordered dismissed and the dismissal was approved by the Tennessee Supreme Court in the case of Knoxville Ice & Cold Storage Company vs. City of Knoxville, 284 South Western Reporter, 866.

It was decided that it was lawful for the city to contract with the railroad for the building of the viaduct, with provision that the railway company should reimburse the city for one-half the cost. This contract was held not to violate a provision of the Knoxville charter, limiting appropriations of the municipal revenue to municipal purposes. The Supreme Court said:

"If the city has authority to pay the entire cost of the viaduct, or such part as it may regard as just and equitable, it has the power to contract with the railway company to advance the whole of the cost, the railway company to reimburse the city for one-half. The lesser power is embraced in the greater."

Fair and Equitable Assessments In Ithaca, New York



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Fair Assessments

The crux of the taxation problem is fair and equitable assessments. When people kick about their taxes the real basis of their complaint usually is that they are paying more than their neighbor, or that residences are taxed disproportionately to business blocks. The new assessment plan will not popularize paying taxes, but it ought to furnish a pretty good guarantee that the basis on which taxes are levied is fair and equitable.

The experts the city has brought here to work out the assessment problem will provide the method of assessment. They will not fix the basis of valuations. Land values will be determined, as they should be, by the best judgment of Ithaca people qualified to pass on them. The basic valuations will be fixed by Ithacans. When they are established, the methods of the experts — which have been adopted and worked out with great success in numerous cities — will be used to make the other necessary calculations, value of buildings, etc.

These methods are uniform and fair. They will apply to every piece of property in the city. And they will furnish the city with most valuable data, which is now lacking. No data now is available to determine fair valuations; in a law suit over an assessment the city attorney would be hard put to it to support his case by worthwhile evidence.

Assessments in Ithaca as elsewhere have been made hit or miss, haphazardly. As for the cost of the service, that will be more than recouped by the increase that will come to the city from state income taxes, once the state is convinced that the valuations here are right.

The city administration has done no greater service to Ithaca than this.

THE accompanying editorial summarizes the methods of scientific valuation followed in our assistance to taxation officials in nearly one hundred American cities; and outlines the benefits to those communities due to the adoption of systematic assessment methods.

Taxation based on inequitable assessments is dishonest taxation. There can be no real reform in taxation that is not based on *equitable valuation.*

We have just published a 315-page book, "The Science and Practice of Urban Land Valuation," which sells for Five Dollars, postpaid. This book is interestingly technical. It points out the difficulties in the way of scientific land valuation, and shows how these difficulties can be overcome. Taxation officials, appraisers, property owners, attorneys and others interested in the subject of land-value analysis will find this book worth many times its cost.

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Zoning Notes

Prepared by Frank B. Williams

Author of "The Law of City Planning and Zoning"

From data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Ordinances

EVERETT, MASS.—Ordinance, August 2, 1926.

Recent Zoning Decisions

CALIFORNIA.—*Jardine v. City of Pasadena*, 248 Pac. Rep. 225. A hospital constructed and maintained for treatment of contagious diseases is not a "nuisance per se"; but if, improperly conducted, it becomes a nuisance, it may then be restrained as such.

The legislative body of the city, in adopting the ordinance fixing the location of the isolation hospital, was exercising its legislative function.

The fixing of the location of the hospital within the limits of a residential district in which such a structure was forbidden, was virtually an amendment of the zoning ordinances of the city; and there can be no doubt of the right of the city to amend its zoning ordinances.

CALIFORNIA.—*Kubach Co. v. McGuire*, 248 Pac. Rep. 676. A city charter provision, limiting the height of buildings in certain districts to 150 feet, does not, in the absence of express language to that effect, restrict the height of buildings erected by the city.

LOUISIANA.—*Van Horn v. City of New Orleans*, 109 So. Rep. 484. Property situated in a district made residential by a zoning ordinance which had previously been used for business purposes but was unoccupied at the time of its purchase and the adoption of the ordinance, cannot thereafter be used for business purposes not permitted by the ordinance in that district.

Setback Provisions Sustained by the Highest Court of Ohio

OHIO.—*Harris, Building Inspector of City of Warren v. The State, on relation of Ball, Court of Appeals*, September 10, 1926. The city had enacted a comprehensive zoning ordinance, including provisions for setbacks. The applicants for a permit sought to enclose an open porch, lawfully erected beyond the setback lines, thus converting it into a room to be used in connection with their residence. This is contrary to the setback provisions of the district. The application was denied by the Building Inspector and on appeal to the Board of Appeals the decision of the Building Inspector was sustained. Mandamus to compel the issue of the building permit was granted in the higher court. *Held*, overruling the decision below, that the decision of the Board of Appeals should be sustained. The constitutionality of comprehensive zoning, including the establishment of reasonable setbacks, was affirmed in *Pritz v. Messer*, 112 Ohio State Reports 628, which the Court reaffirms. The notable case of *Wulfsohn v. Borden, Inspector of Buildings in the City of Mount Vernon*, 241 *N. Y.* 288, in the highest court of the state, to the same effect, is noted.

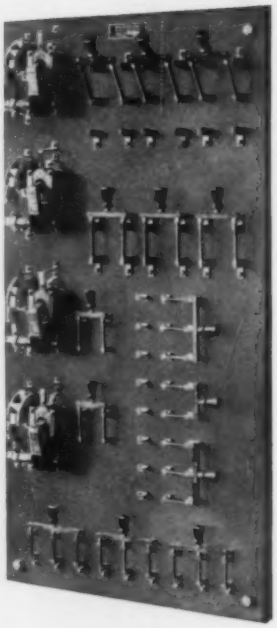
The only remaining question is as to the reasonableness of the particular setback provisions in question. In deciding that they were reasonable the Court says:

"The lines were established by taking the average distance from the street of the buildings in any block at the time of the passage of the ordinance. The city of Warren and these buildings have existed for a long time prior to the passage of the ordinance and it would be exceedingly difficult to provide a specific setback line to be applicable the same in each particular block. The setback line on both sides of York Street, including the location in question, is 25 feet, and it is so fixed between Market Street and Ward Avenue. In the next block it is 22 feet, and so it varies all over the city of Warren, fixed with reference to the buildings already erected. Had it not been so, the person who might erect a new building and attempt to conform to a definite and fixed setback line, perhaps, would have found himself in a pocket between two buildings which had been formerly constructed. And if such had been the provisions of this ordinance, there would have been but little question that its terms would have been held to be unreasonable and unjust and unwarranted interference with property rights.

"But can a fairer method be suggested by which setback lines could be fixed and the rights of property holders determined in this respect than by taking the average distance of the buildings within a block from the street line to the street wall of the building, granting to each property owner fair consideration by striking an average line as indicated. Therefore, it cannot well be said that the line as fixed in the instant case is unreasonable, and especially in view of the fact that this record does not disclose any testimony whatever to the effect that it is. The very fact that this average was adopted by the authorities of the city of Warren suggests to the average mind the spirit of fairness that must have controlled in the attempt to provide a zoning ordinance for the city."

"Therefore, it is sufficient to say that it could not well be maintained that this setback line in question is unreasonable, nor could this Court so find in view of the fact that there is no testimony whatever disclosed by the record that it is unreasonable."

The reader will remember that in the Pennsylvania case of *Appeal of White* (summarized in "Zoning Notes" for September, 1925), somewhat similar setback provisions were held to be unreasonable. That decision was in the Superior Court, and has now been affirmed by the Supreme Court of that State. (See the *Municipal Law Reporter of Pennsylvania*, September, 1926.)



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Municipal and Civic Publications

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Introduction to the Study of Public Administration.—By Leonard D. White, Ph.D., Professor of Political Science in the University of Chicago. The Macmillan Company, New York. 1926. XIII + 495 words. $3.25 postpaid.

The author has assumed the fundamental similarity of all administration, and therefore gives no separate discussion of federal, state, or municipal management; nor does he present the technique of administration. This is a study of structure and principles, and is designed for students of political science and for citizens who wish to understand more clearly the underlying problems of administering governmental units. Sufficient illustrative material is given to provide up-to-date authority for the analytical conclusions drawn in any field of the discussion, and to give an enlivening quality to the book. Among the lines of study followed out are: the obligations of the administration to forces and agencies outside itself—the legislature, the courts, the political parties, and private organizations; the type of administrative machine and the tests of its proper working; centralization; integration—the working of the administrative machine as a unit; department organization; the many problems of personal management, salaries, and retirement systems; the rule-making power of the administrator rather than of the legislator; and, in summary, the trends of modern administration.

The Science and Practice of Urban Land Valuation.—By Walter William Pollock, President, The Manufacturers' Appraisal Company; and Karl W. H. Scholtz, Ph.D., Assistant Professor of Economics, University of Pennsylvania. Published by The Manufacturers' Appraisal Company, Philadelphia. 1926. VIII + 315 pp. Diagrams. $5.00 postpaid.

This is an explanation of the methods invented by the late William A. Somers for the scientific appraisal of city land—the Somers Unit System of Land Valuation. The three divisions of the study are: Principles of Land Valuation—showing that community opinion should be ascertained as to the comparative usefulness and the relative importance of different locations to the community life in terms of definite unit areas, and that this opinion should be interpreted by means of mathematical computations so that the valuations will be proportionally distributed over the different sites; Practice of Land Valuation—showing how the work of getting community opinion and applying it is actually accomplished; Significance of Scientific Land Valuation—showing the political, social, and economic effects of equitable assessment. The appendices contain ten illustrative tables for computing values of retail business district corners at whatever angle, and other tables for computing the values of irregular inside lots and the point and direction of "reflected" value from a neighboring street. Our readers are referred to pages 497—500 of the October issue for an account of the experience of Jamestown, N. Y., in the reassessment of its real estate according to the Somers system.

Library Extension; A Study of Public Library Conditions and Needs.—By the Committee on Library Extension of the American Library Association. Published by the American Library Association, Chicago. 1926. 163 pp. Map. $1.75.

The objectives and program of the library extension movement are of importance to all organizations and individuals interested in civic and social progress. It is desired to strengthen public opinion as to the value of public libraries and of high standards of library service; to make city libraries effective throughout their service areas; to secure adequate rural public library service through the county or other large unit; and to further library extension through state leadership. This book tells in detail what has been found out regarding the amount and conditions of library service in the United States and Canada, as a basis for intelligent, organized effort toward the Association's objectives.

American Foundations.—*Bulletin* of The Russell Sage Foundation Library, 130 East 22nd Street, New York. August, 1926. Revised edition. 48 pp. A selected bibliography on American foundations for social welfare, giving only official publications (not including official periodicals) indicative of the work of the various foundations. 35 cents. (Apply to the Library.)

Report of a Survey of Transportation on the State Highway System of Connecticut.—By the Bureau of Public Roads, U. S. Department of Agriculture; and the Connecticut State Highway Department. 1926. 101 quarto pp. Views, maps, diagrams, tables. Apply to Government Printing Office, Washington, D. C. 30 cents.

The survey was begun in September, 1922, and continued for one year, during which time traffic data were recorded at 57 survey stations. The data recorded included all passenger-car information and the principal types of motor-truck information, with the exception of weights. At eight of the 57 stations located at key points on the principal highways in different sections, the weights of the vehicles were recorded. The amount of traffic observed has been used as the basis for an estimate of the traffic on the same roads in 1930—believed to be probably twice as great as that of 1924—which may be taken as a reliable guide in the planning of the highway program for the next five years. This is a most interesting and valuable report.

Firemen's Hand Book.—Compiled by Captain George H. Murray, San Francisco Fire Department. Published by Duddy & Kibbee Printing Company, San Francisco. Second edition, 1926. 199 pp. Illustrated. $1.75 postpaid.

A primer for recruits for fire fighting. While this handy size book has been published especially for San Francisco and Oakland, Calif., it contains much material of value for all volunteers in fire prevention and control, particularly for those who are organizing private fire brigades in mercantile establishments located at a distance from paid fire departments. It also has a place in high school libraries as a book of reference for students who are required to write papers on the fire-fighting function of municipalities. It covers the general duties of firemen, hosemen, and truck companies; the use of fire-boats, drill towers, the fire-alarm and high-pressure systems, motor apparatus, auxiliary fire appliances and fire department aids; instruction in means of fire prevention, and in artificial respiration; and material on formation for parades and funerals.

A Handbook of Extra-Curricular Activities in the High School.—By Harold D. Meyer, A.M., Associate Professor of Sociology and Chief of the Bureau of Recreation and Community Development, University of North Carolina. A. S. Barnes & Company, New York. 1926. 402 pp. Illustrated. $4.00.

This book ought to prove valuable to high school principals, especially those directly connected with the small high schools, and also to civic organizations in small communities, in the development of boy and girl activities. It is evident that the author has put into this book a considerable amount of research, having gathered the form and method of organizations illustrative of a nation-wide experience. The book is splendidly illustrated and the text is free from over-theorization. Interspersed with the actual text is a considerable amount of reflective writing on community problems and opinion. Behind each section of the book is a comprehensive bibliography. The principal sections of the book deal with character building and citizenship training; clubs, their organization and functioning; student participation in school administration; physical education; commencement exercises; publicity and publications; and a discussion of some of the agencies that are rendering supplementary community service, such as the Boy and Girl Scouts, the Playground Association, and the National Safety Council. In spite of the fact that the author has gone into each section of activity with considerable detail, he has not endangered the spirit of initiative and enterprise that allows for the free development of personality.

Play Space for Elementary School Children.—By George E. Johnson, Harvard University. 8 quarto pp. in *The Playground* for October, 1926. Illustrated. This study involves the consideration of: (1) plays and games every boy and girl should know; (2) the standard amount of space needed for the pursuit of these activities by a given number of children of the ages involved; (3) the application of this standard to the schools of Xville. 25 cents. (Apply to Playground and Recreation Association of America, 315 Fourth Avenue, New York.)

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City Problems.—Proceedings of the Seventeenth Annual Meeting of the Conference of Mayors and Other Municipal Officials of the State of New York, held in Schenectady, N. Y., June 16-18, 1926. 187 pp. Containing the reports, papers, and discussion given at the Conference on many phases of municipal work and interest; also a summary of the year's work. (Apply to William P. Capes, Executive Secretary of the Conference, Albany, N. Y.)

New Civic Biology—Presented in Problems.—By George William Hunter, Ph.D., Professor of Biology, Knox College, Galesburg, Ill. American Book Company, New York. IX + 448 pp. Illustrated. $1.68.

A textbook for high school pupils, for the study of living things—plants, animals, human beings—from the standpoint of understanding and producing the proper qualifications for citizenship. Take the chapter on Man's Improvement of His Environment. It presents these problems: How may we improve our conditions at home? At school? How does the community care for the improvement of our environment? By the inspection of buildings, of food supplies, of milk; by the care of water-supplies, the disposal of wastes, and the care of public health. The laboratory suggestions include the home exercise of ventilating the bedroom; demonstrating the effect of a duster and a damp cloth upon bacteria in the schoolroom; a comparison of luncheon dietaries; the sanitary survey of a given area in the town; demonstrations of the bacterial contents of different grades of milk, of water, and dilute sewage; the plotting of curves from board of health tables to show the mortality from certain diseases during certain times of year; and a study of the work of the local board of health.

Historical Aspects of the Immigration Problem, Select Documents.—By Edith Abbott, Dean of the Graduate School of Social Service Administration and Professor of Social Economy in the University of Chicago. The University of Chicago Press, Chicago. 1926. 881 pp. $4.50 postpaid.

The discussion of immigration is too often a reflex of individual prejudice. The method of handling the immigrant is too often but an attempt to compel the newcomer to shape himself with a rigid mold of our own creating and preconceived idea of what American life should be. Probably more futile gush has gone into the discussion of immigration than into any other of our great national problems. Miss Abbott has attempted to apply the principle of the scientific method to a discussion of this great question by building up her argument from a variety of documentary evidence. The volume is one of a series of publications issued by the University of Chicago intended primarily for the use of students of social science. It is a pleasure, however, to recognize in this volume a sincere attempt to place before the American public a discussion of immigration apart from the usual wishy-washy argument. No one can study this interesting series of documents without obtaining a comprehensive picture of what America means to the newcomer and how communities may best prepare themselves for meeting the problem of assimilation. The volume is divided into five main sections, dealing with causes of immigration, economic aspects of the problem, assimilation, pauperism and crime in relation to the immigrant, and public opinion. The volume is a distinct contribution to social literature, as might be expected from Miss Abbott, and ought to clear the ground of considerable dead-wood.

Children.—Volume I, Number 1, of *The Magazine for Parents*, published by The Parents' Publishing Association, Inc., 353 Fourth Avenue, New York, of which George J. Hecht is President. The board of editors, the consultants, and the advisory editors show that the magazine will have the cooperation of the leading educational and child welfare agencies, private, public, and governmental. The magazine will have nothing for children to read, but will deal with all the problems which parents meet in bringing up their children. The opening article in this first number is by Dorothy Canfield Fisher and is entitled "The Stuff Contentment Is Made Of." An Editor's Clip Sheet is issued by the magazine, for which application may be made at the address above.

Alleged Failures of Municipal Ownership.—In *Public Ownership* for August, 1926. "Refutation of the Widespread Stories of Municipal Light and Power Plants that Have Failed, Been Abandoned, Leased, Sold, or Junked—A Reply to Private Power Companies' Propaganda. Municipal Plants Are Not Vanishing; Municipal Ownership Is Not on the Wane." By Carl D. Thompson. (Apply to the author, as Secretary of the Public Ownership League of America, 127 North Dearborn Street, Chicago, Ill.)

Rapid Transit for St. Louis.—Report submitted to the Board of Aldermen September, 1926. XIV + 338 quarto pp. Views, maps, diagrams, tables. $5.00.

This report was submitted by E. R. Kinsey, President of the Board of Public Service, St. Louis, with whom has been associated in the survey and the preparation of the report, C. E. Smith, consulting engineer, of St. Louis. In order to determine whether St. Louis could afford rapid transit, a study was made of its business, resources, prospects, governmental costs, etc., resulting in an affirmative answer. All the conditions affecting mass transportation in that city were studied, and in connection with the analysis of local conditions an examination was made of the legal and financial procedure by which rapid transit has been secured in other cities, and its present and future extent, with comparisons between American and foreign practice. This part of the report covers New York, Chicago, Philadelphia, Boston, Detroit, Pittsburgh, Los Angeles, San Francisco, Cleveland, and Baltimore; London, Paris, Berlin, Hamburg, Budapest, Glasgow, Liverpool, Madrid, Naples, Tokio, Bombay, Sidney, Buenos Aires. The street plan and traffic control are not dealt with except as they are affected by the problem of mass transportation. The report is an elaborate and rather complete treatise on local transportation in any city of about the size of St. Louis.

The National Government and Public Health.—By James A. Tobey, M.S., LL.B., Fellow A.P.H.A. The Johns Hopkins Press, Baltimore, Md. 1926. XVIII + 423 pp. $3.00.

This is one of the Studies in Administration made by the Institute for Government Research, Washington, D. C., and presents a review of all work in the field of public health promotion and protection that is being done by the several administrative services of the Government. It shows why such work has been undertaken in each case and what relation it bears to the other activities performed by that branch of the service; what advantages would naturally follow from having public health activities more largely performed by those services primarily devoted to health promotion; and what benefits would result from having these public health promotion services under the direction of a department of public health or under the direction of an assistant secretary in some other department, for example, that of education; in other words, it shows the advantages of greater centralization and coordination of the public health work of the Government. The relation of the National Government to state and local health administration is thoroughly explained. The study is detailed and comprehensive—and far from dull. There are at present 14 administrative units directly concerned with public health duties, and about 25 other Federal agencies incidentally interested in public health or carrying on work of a purely medical character; results—diffusion of responsibility, duplication of activities, and lack of efficiency and economy.

Modern Science and People's Health.—Edited by Benjamin C. Gruenberg. Contributing editors, Charles R. Stockard, Hugh S. Taylor, Walter H. Eddy, William A. White, C.-E. A. Winslow, Haven Emerson. W. W. Norton & Company, Inc., New York. 1926. VI + 250 pp. $2.50.

The first of the seven lectures printed in this book is by the editor of the volume, and shows that it is the concern of democracy to make increasing use of science by overcoming superstition with education. In the order stated above, the contributing editors speak as follows: the anatomist, on what science has learned about heredity and environment; the chemist, on what drugs are doing for the prevention and cure of disease; the physiologist, on the principles of diet and nutrition, and new discoveries in food and special treatment of disease; the psychiatrist, on how one lives in the complex conditions of today; the bacteriologist, on the fight against communicable disease; and the former public health official, on how these experimental sciences are lengthening and strengthening life.

Financial Control and Accounting for a Chamber of Commerce.—One of a series of pamphlets issued by the Organization Service of the Chamber of Commerce of the United States, Washington, D. C. August 10, 1926. 65 pp. Illustrated with forms to be used. Part I presents the steps to be taken, the forms to be used, and the methods to be employed in handling the financial matters of a chamber of commerce in a businesslike and orderly way. The procedure described was developed and the text written by Thomas W. Howard, Assistant Manager of the Department of Manufacture of the Chamber, and in charge of its accounting work. Part II describes a much-needed addition to the records of chambers of commerce—membership statistics and costs. (Apply to Colvin B. Brown, Manager, Organization Service, Chamber of Commerce of the United States, Washington, D. C.)

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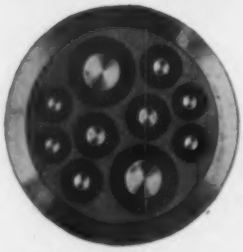

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Sources of Reasonable Potential Revenues for New Jersey Municipalities.—Four reports (Nos. 179, 180, 181, 182) issued August 27, 28, and September 1 (two) respectively, by the New Jersey State League of Municipalities Bureau of Municipal Information, 34 West State Street, Trenton, N. J.: Fees Charged by Fire Departments for Permits and Services in New Jersey Municipalities; Fees Charged by Building Departments in New Jersey Municipalities; Fees Charged for Inspections and Permits by Health Departments in New Jersey Municipalities; Fees Charged for Services and Permits by Police Departments in New Jersey Municipalities. The information is given in the hope that it may suggest to municipal officials some new sources of revenue. Mimeographed. (Apply to Sedley H. Phinney, Executive Secretary of the Bureau.)

Construction of Airports.—By D. E. Keyhoe. Information Bulletin Number 2 of the Information Division, Aeronautics Branch, Department of Commerce, Washington, D. C., of which Ernest Jones is Chief. 14 pp. of mimeographed material, with designs. "The airport is as much a recreation facility as the parks, golf courses, equestrian trails, etc., and should be preferably a municipal enterprise. In fact, the Air Commerce Act recognizes this by providing that airports shall not be owned or operated by the Federal authorities, and that no exclusive rights shall be granted for the use of any civil airway or navigation aid owned by the United States." (Apply to the Division.)

The Business Administration of a City School System.—By Harry Pearse Smith, Ph.D. No. 197 of the Contributions to Education, issued by the Bureau of Publications, Teachers College, Columbia University, New York. 1925. IX + 129 pp. Diagrams, graphs, tables. The problem dealt with is: Shall the administration of a city school system be unified in one chief executive officer, or shall there be two coordinate administrative departments separating the administration of business activities from that of instruction? The solution proposed by the writer is: unified administrative control centered in one individual whose point of view is primarily educational. "This will center the responsibility in one executive officer who can be held strictly accountable for the success or failure of the educational work under his direction and will insure an educational point of view in the administration of educational activities." (Apply to Teachers College.)

Salaries of Village Officials in Wisconsin, 1926.—Compiled by Lorna L. Lewis. Information Report No. 51 of the Municipal Information Bureau, University Extension Division, University of Wisconsin, Madison, Wis., August, 1926. 16 mimeographed pp. Embodying information received from 304 of the 353 Wisconsin villages to which a questionnaire was sent. The salaries shown are those in force for 1926-27, with certain exceptions for 1925-26. (Apply to Ford H. MacGregor, Chief of the Bureau.)

Texas Water Works Short School.—The Eighth Texas Water Works Short School was held at Fort Worth, Texas, January 18-23, 1926. This volume contains a brief discussion of the purposes of the Water Works Short Schools, by W. S. Mahlie, President of the Texas Section of the Southwest Water Works Association, together with the text of all the lectures and papers presented at the Eighth Short School. 186 pp. Cloth, $2.50; paper, $1.25; postage, 10 cents. (Apply to E. G. Eggert, Treasurer, Texas Section, Southwest Water Works Association, Care State Health Department, Austin, Texas.)

Readings in Civic Sociology.—Selected and edited by Edward Alsworth Ross, Ph.D., LL.D., Professor of Sociology, University of Wisconsin; and Mary Edna McCaull, M.A., Teacher of Civics, Abraham Lincoln High School, Des Moines, Iowa. World Book Company, Yonkers-on-Hudson, N. Y. 1926. XXI + 398 pp. $1.80.

These readings are intended to be used in connection with textbooks in civics, to illustrate or confirm their statements. Among the general subjects presented are: the trend of population; the increasing pressure on natural resources; the drift to the cities; the spread of the use of machines; the transformation of the home; the family; child welfare; education; standards of social distinction; social defense against crime; poverty and its relief; the place of party; public opinion; and the citizen as voter. Public documents and statistics are quoted for facts; recognized authorities are quoted for opinions.

Progress in Planning for the Niagara Frontier Region.—Published by the Niagara Frontier Planning Board, 37 Main Street, Tonawanda, N. Y. 15 pp. Illustrated. A call for the support of every interest on the Niagara Frontier to secure the carrying out of the plans described. (Apply to the Board.)

Delinquent Taxes.—The Volume, the Costs, and How to Reduce Them.—By Hon. J. B. Morris, City Attorney, Beaumont, Texas. A paper read before the Corpus Christi convention of the League of Texas Municipalities. 4 pp. in *Texas Municipalities* for August, 1926. The author recommends a more aggressive exercise of the tax collectors' powers in the seizure and sale of personal property on which there are delinquent taxes. (Apply to League of Texas Municipalities, 815 Capitol Avenue, Houston, Texas.)

American Society for Testing Materials—Standards.—Adopted in 1926. This is the second Supplement to the 1924 book of A. S. T. M. Standards and contains 16 Standards adopted by letter ballot of the Society on September 1, 1926; also the replacements of 7 Standards appearing in the Book of Standards. 102 pp. (Apply to the Society, 1315 Spruce Street, Philadelphia, Pa.)

Housing and Regional Planning, New York State.—Report of the Commission of Housing and Regional Planning to Governor Alfred E. Smith, May 7, 1926. As a basis for a plan for the future development of the state, this report covers the forces that have shaped the present state—the natural conditions, the early development, state-wide growth, and urbanization—and the new forces shaping the future, and shows the great need of a plan. 82 pp. Many maps and diagrams. The report is submitted by Clarence S. Stein, Chairman of the Commission. (Apply to George Gove, Director, Bureau of Housing and Regional Planning, 949 Broadway, New York.)

Prohibition at Its Worst.—By Irving Fisher, Professor of Economics, Yale University. The Macmillan Company, New York. 1926. 255 pp. Charts. $1.75.

Professor Fisher was reluctantly converted to Prohibition some years ago. In meeting the request of the Association Against the Prohibition Amendment and the Moderation League to "face the facts," he presents nine groups of statements as the outline of this book. They are to this effect: that the present situation of imperfect enforcement is intolerable, but that conditions are not so bad as represented and that Prohibition has accomplished much hygienic, economic, and social good, including over six billion dollars a year in cold cash values; that the "personal liberty" argument is largely illusory, and that real personal liberty—to live and enjoy the full use of one's faculties—is increased by Prohibition; that what the opponents of Prohibition really want cannot be accomplished by amending the Volstead Act without thereby violating the Eighteenth Amendment; that to repeal the amendment is out of the question, and that to nullify it would enormously increase disrespect for the law; that therefore the only satisfactory solution is to enforce the law, which is a practical possibility. The author believes that it was a great tactical blunder to drop the educational program and turn to mere law observance, and that what is needed is to go back to first principles and educate the public to understand the basic reasons for Prohibition.

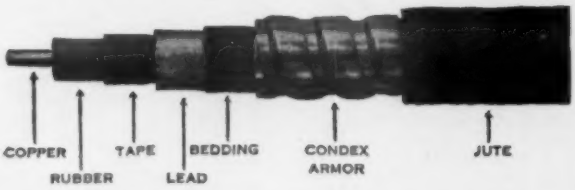
International Golden Rule Sunday.—By Charles Vernon Vickrey, General Secretary of Near East Relief. Introduction by Albert Shaw, Editor, *Review of Reviews*. George H. Doran Company, New York. 1926. 149 pp. Illustrated. $2.00.

In fifty countries International Golden Rule Sunday is now observed. On that day in many homes the dinner consists of approximately the same menu that is provided in the orphanages of the Near East Relief, and the amount of money that would otherwise have been spent is sent to do as the givers would be done by were their own children in the same condition as the children of the Near East. In Part II of this book is given practical information about organizing and carrying out city, community, and local committee work for the proper public and private observance of the day, with accounts of how Tacoma, Wash., and Hartsville, S. C., did it; typical proclamations by governors and mayors, and effective methods and means of publicity. This year, Golden Rule Sunday is December 5.

Play Activities for Elmentary Schools—Grades One to Eight.—Compiled by Dorothy La Salle, First Assistant in Health Education, Detroit Public Schools. A. S. Barnes and Company, New York. 1926. 179 pp. Illustrated. $2.00.

A handbook of methods and material for use in school sportsmanship programs, games, and competitive athletics. "The first and best place to begin to teach the child to conform to the rules and laws of society is to teach a game well and to have every one learn to conform to the rules of the game." The material is analytical as to the principles involved in the various departments of physical training, and detailed in the instructions for recreational activities.

CONDEX PARK CABLE



The flexible, locked steel conduit is a steel tape applied spirally around the lead-covered conductor. This steel armor and the unique way in which it is applied form the main distinguishing feature of CONDEX Park Cable. The steel completely covers the cable under all conditions and is securely locked together in such a way that there is little possibility of any portion of the cable ever becoming exposed to mechanical injury. The arch effect of the overlapping, interlocking steel gives unusual resistance to crushing.

The same careful workmanship goes into CONDEX Park Cable and the same high standard of quality is maintained that characterizes other well known Simplex products. It stands in the same class with FIBREX Tree Wire and TIREX rubber-sheathed cords and cables.

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Elkhart, Indiana

Reinforced Concrete Culvert Pipe.—Report of the Joint Concrete Culvert Pipe Committee submitting tentative standard specifications for reinforced concrete culvert pipe, presented at the Twenty-second Annual Convention of the American Concrete Institute, Chicago, February 23-26, 1926, by Committee J-2, the Institute's representation on the Joint Concrete Culvert Pipe Committee. July, 1926. 12 pp. Illustrated. (Apply to the Institute, 2970 West Grand Boulevard, Detroit, Mich.)

The Future Almshouse Will Be a County Hospital.—By Ellen C. Potter, M.D., Secretary of Welfare, Harrisburg. 4 quarto pp., illustrated, in *The Nation's Health*, August 15, 1926. A paper presented at the National Conference of Social Work, Cleveland, Ohio, May 29-June 2, 1926. "Although no institution has arrived at a state of perfection, those that care for paupers seem specially designed not to do the Necessary Work of Rehabilitation." A part of the campaign for hospitalizing and socializing the administration of the almshouse. (Apply to The Modern Hospital Publishing Co., Inc., 22 East Ontario Street, Chicago, Ill.)

Use and Cost of Ice in Families with Children.—By Elsie P. Wolcott, Bureau of Social Surveys, Department of Public Welfare, Chicago, Ill. 1925. 20 pp. The particular value of this study lies in its relation to the facts regarding the use of fresh milk as an essential part of the diet of young children. It is clearly shown that efforts should be resumed to secure a more extended distribution of free ice and milk, and to educate families as to the waste and dangers of not properly preserving food supplies. (Apply to the Bureau.)

Stadiums.—Tables, with introductory material, giving the details of university, high school, private, Federal, and county stadiums throughout the country, as to date, managing authority, seating capacity, size, shape, construction, cost, method of securing, means of maintaining, and uses. 10 quarto pp. in *The Playground* for July, 1926. (Apply to Playground and Recreation Association of America, 315 Fourth Avenue, New York.)

City Planning for Buffalo, N. Y.—Three articles from "Questionnaire on Buffalo," a supplement to Buffalo's Textbook, which has been authorized for use in the public and Catholic schools of the city. The articles are: Planning the City, by George H. Norton, Chairman, City Planning Committee; Niagara Frontier Planning, by Chauncey J. Hamlin, Chairman, Niagara Frontier Planning Board; and Highway Transportation in Erie County, by George C. Diehl, County Engineer. 12 pp. Distributed with the compliments of the manufacturers & Traders Trust Company, of Buffalo, which calls attention to the authoritative articles in the Questionnaire dealing with the manufacture and distribution of Buffalo and Niagara Frontier products. (Apply to the Company.)

Reports Received

CLARKSBURG, W. VA.—Five years of Council-Manager Government, year ending June 30, 1926

EAST CLEVELAND, OHIO.—Annual Report of the City under Commission-Manager Plan; also Annual Report of Public Library; 1925

LITTLE COMPTON, R. I.—Tax Book of the Town, 1926

ST. PAUL, MINN.—Annual Report, Commissioner of Public Works, 1925

On the Calendar of Conventions

NOVEMBER 8.—ST. LOUIS, MO.
National Association of Civic Secretaries. Annual meeting. Secretary, Herbert E. Fleming, City Club of Chicago, 315 Plymouth Court, Chicago, Ill.

NOVEMBER 8-12.—PINEHURST, N. C.
American Association of State Highway Officials. Annual meeting. Executive Secretary, W. C. Markham, 638 Munsey Building, Washington, D. C.

NOVEMBER 8-12.—WASHINGTON, D. C.
American Society for Municipal Improvements. Annual convention. Secretary, C. W. Sammelman, 3817 Olive Street, St. Louis, Mo.

NOVEMBER 8-12.—WASHINGTON, D. C.
Asphalt Association. Annual Asphalt Paving Conference. Secretary, J. E. Pennybacker, 441 Lexington Avenue, New York.

NOVEMBER 9.—ASHEVILLE, N. C.
National Association of Railroad and Utilities Commissioners. Annual convention. Secretary, James H. Walker, 270 Madison Avenue, New York.

NOVEMBER 9-10.—ST. LOUIS, MO.
National Municipal League. Annual convention. Secretary, H. W. Dodds, 261 Broadway, New York.

NOVEMBER 10.—ST. LOUIS, MO.
Proportional Representation League. Executive Secretary, George H. Hallett, Jr., 1417 Locust Street, Philadelphia, Pa.

NOVEMBER 10-11.—ST. LOUIS, MO.
American Municipal Association. Annual meeting. Executive Secretary, John G. Stutz, Lawrence, Kans.

NOVEMBER 10-14.—WASHINGTON, D. C.
American Country Life Association. Annual conference. Secretary, Henry Israel, Room, 1849, Grand Central Terminal Building, New York.

NOVEMBER 15-19.—PHILADELPHIA, PA.
National Tax Association. Annual meeting. Secretary, Alfred E. Holcomb, 195 Broadway, New York.

NOVEMBER 18-19.—TORONTO, ONT.
Ontario Associated Boards of Trade and Chambers of Commerce. Annual meeting. Secretary, T. Marshall, Royal Bank Building, Toronto, Ont.

NOVEMBER 18-20.—ATLANTA, GA.
American Social Hygiene Association. Annual Regional Conference on Social Hygiene. General Director, William F. Snow, M. D., 370 Seventh Avenue, New York.

NOVEMBER 18-20.—FRESNO, CALIF.
California Municipal Traffic League. Conference on Uniform Traffic Regulation. Secretary, William J. Locke, Alameda, Calif.

NOVEMBER 19-20.—OKLAHOMA CITY, OKLA.
Oklahoma Municipal League. Annual meeting. Secretary, Dr. Harry A. Barth, University of Oklahoma, Norman, Okla.

NOVEMBER 22-23.—ST. LOUIS, MO.
Mississippi Valley Association. Annual meeting. Director of Publicity, R. M. Johnston, Chamber of Commerce Building, St. Louis, Mo.

NOVEMBER 30-DECEMBER 2.—ST. BONIFACE, MAN.
Union of Manitoba Municipalities. Annual convention. Secretary, D. D. McDonald, Dauphin, Man.

DECEMBER 6-9.—NEW YORK CITY.
American Society of Mechanical Engineers. Annual meeting. Secretary, Calvin W. Rice, 29 West 39th Street, New York.

DECEMBER 8.—COLORADO SPRINGS, COLO.
State Association of Commercial Organization of Colorado. Annual convention. Secretary-Manager, Elmore Petersen, Boulder, Colo.

DECEMBER 8-9.—WASHINGTON, D. C.
National Rivers and Harbors Congress. Annual convention. Secretary, S. A. Thompson, 824 Colorado Building, Washington, D. C.

DECEMBER 28-31.—ST. LOUIS, MO.
National Community Center Association. Annual meeting. Secretary, LeRoy E. Bowman, 503 Kent Hall, Columbia University, New York.

JANUARY 10-11.—ST. LOUIS, MO.
International Association of Street Sanitation Officials. Annual conference. Secretary, A. M. Anderson, 10 South La Salle Street, Chicago, Ill.

JANUARY 10-14.—CHICAGO, ILL.
American Road Builders' Association. Annual convention and Road Show. Secretary, Ethel A. Birchland, 27 West 39th Street, New York.

JANUARY 13-17.—WASHINGTON, D. C.
American Engineering Council. Annual meeting. Executive Secretary, L. W. Wallace, 26 Jackson Place, Washington, D. C.

JANUARY 14-15.—SPRINGFIELD, MASS.
New England Association of Commercial Executives. Secretary, E. G. Kingsbury, Chamber of Commerce, Stamford, Conn.

JANUARY 17.—NEW YORK CITY.
American Institute of Consulting Engineers. Annual meeting. Secretary, P. W. Henry, 111 Broadway, New York.

JANUARY 19-21.—NEW YORK CITY.
American Society of Civil Engineers. Annual meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

JANUARY 20.—NORFOLK, VA.
Virginia State Chamber of Commerce. Annual meeting. Managing Director, R. LeRoy Hodges, 708 Grace-American Building, Richmond, Va.

JANUARY 27.—HARRISBURG, PA.
Pennsylvania State Chamber of Commerce. Annual meeting. Secretary, George E. Foss, State Chamber of Commerce Building, Harrisburg, Pa.

JUNE 6-11,.—CHICAGO, ILL.
American Water Works Association. Annual convention. Secretary, Beekman C. Little, Rochester, N. Y.

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Do you realize that sometimes the only difference between a thriving, up-to-date city and an overgrown country town lies in the plans made for systematically taking care of expansion?

When growth reaches a certain point, renumbering of buildings is necessary. The Niagara Metal Stamping Corporation has helped many municipalities with suggestions and practical advice gained by experience in furnishing house numbers to representative cities throughout the United States.

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News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Low Operating Cost of Diesel Engines

The important advantage of the diesel engine plant for municipal installations, according to a statement recently issued by Fairbanks, Morse & Company, Chicago, Ill., is that the savings over the cost of steam or purchased power will soon pay for the installation. Then, after the plant has been paid for, the added profits make it possible to reduce taxes or service rates. To show why this is possible the power costs of a typical plant are analyzed.

For the purpose of this discussion a plant equipped with three 120-h.p. diesel electric units is considered. It has been found from long experience that such a plant will produce ten kw. hours for each gallon of fuel oil consumed. The application of three engines in such a plant means that each engine can be operated at practically ful load As the load changes, the units are started or stopped, so that each is operated at from three-quarters to full load, the range where the fuel consumption is lowest per electrical unit.

A plant equipped with three 120-h.p. diesel engines, each driving a 90-kilovolt-ampere alternator, would represent a plant capacity of 216 kw. at an 80 per cent power factor load, which is the normal rating of the plant. If such a plant ran 24 hours a day for 365 days and at 216 kw. for the full time, it would produce 1,892,160 kw. hours, which would be equivalent to a yearly plant factor of 100 per cent. That is, the full capacity would be in use every hour in the year.

An average plant, however, seldom has a yearly plant factor of more than 50 per cent, because of fluctuations in the load demand and because in most plants it is unnecessary to operate the full twenty-four hours. If this plant were assumed to operate on the basis of 50 per cent yearly plant capacity, it would generate 946,080 kw. hours. This does not mean, however, that each engine operates at 50 per cent load. By shutting down and starting up at the proper time, each unit can be operated at nearly full load or at least can average 80 per cent of load. This is termed the operating load factor of the unit and it is this factor that has a bearing on the number of kw. hours which can be produced for one gallon of fuel oil.

Under such conditions, the plant will easily produce 10 kw. hours per gallon of fuel oil and the production of 946,080 kw. hours would require 94,608 gallons.

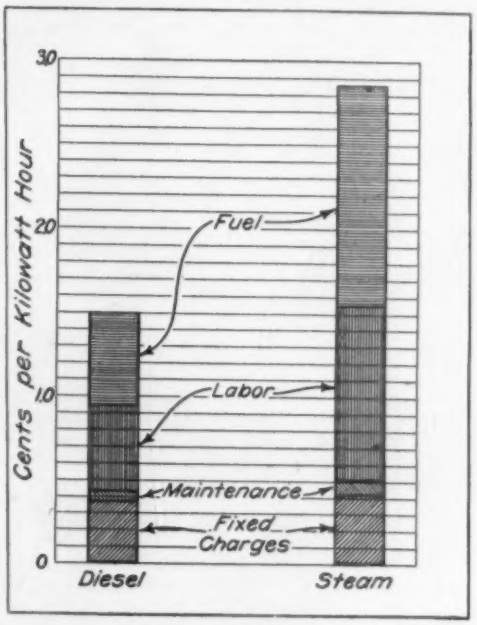
The cost of fuel varies from about 3½ cents to 8 cents per gallon, depending upon the section of the country in which it is bought and on the quantities purchased. The average price for a large number of plants has been found to be 5 cents per gallon. The fuel cost for the plant under consideration would be $4,730 per year.

Diesels of modern design will produce 1,200 rated kw. hours with a lubricating oil consumption of one gallon. For the production of 946,080 kw. hours, approximately 962 gallons of lubricating oil would be required, which, at a cost of 55 cents per gallon, would amount to $531.

Labor cost is an item which is often greatly over-estimated in considering the diesel engine plant. A study of a large number of Fairbanks-Morse-equipped plants has shown that one man on each shift can operate a diesel engine plant equipped with three engines, and the labor cost for such a plant seldom exceeds $5,000 per year. This labor cost is divided up between an engineer and two watch engineers.

The three main items of operating expense—fuel oil, lubricating oil, and labor cost—total $10,210, or 1.07 cents per kw. hour. This cost for generating a kw. hour is not at all out of the ordinary and it is substantiated by hundreds of diesel engine plants. In fact, many of them operate for less than this figure because of a higher yearly load factor which reduces the labor cost per kw. hour.

Another operating item which should be allowed for in a well-managed plant is the cost of maintaining the plant in good operating condition. The best of machinery requires the renewal of parts as the years go by. It has been the experience of owners of diesel plants that this item is very low. Many plants, however, set aside a definite percentage of the cost of th equipment to cover such



RELATIVE COSTS OF ELECTRIC POWER IN DIESEL AND STEAM PLANTS

CELITE

Insures Better Concrete at Less Cost

ADDING CELITE AT THE MIXER—A PHOTOGRAPH FROM A NORTH CAROLINA HIGHWAY PROJECT.

"THREE POUNDS OF CELITE"
Insuring better concrete at the source

Celite added at the mixer insures better concrete at less cost by effecting:

Improved workability: The concrete discharges readily from the mixer. Segregation is absolutely prevented. Time and labor are saved in placing. Uniformity is assured throughout the finished concrete.

Increased yield of concrete in place: Celite increases the yield of finished concrete, making about five per cent more concrete from the same quantity of cement and aggregate.

Higher average strength: Concrete made with Celite is stronger than ordinary "field concrete." Both average strength and minimum or effective strength values are increased. Honeycombing can be eliminated altogether.

Water-tightness: Resistance to water penetration is effected by improved uniformity and a marked decrease in the size of the individual voids in the finished concrete.

The amount of Celite required in a mixture to "make the most of concrete," determined by the nature and proportions of the ingredients, varies from two to six per cent of the weight of the Portland cement content.

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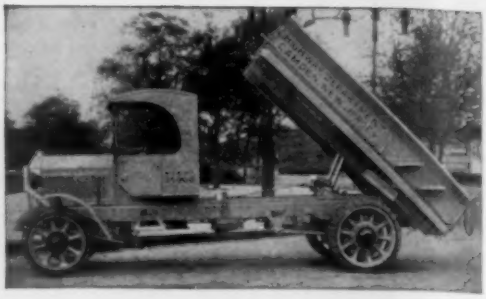

Special Insulated Asphalt Dump Body mounted with the Heil Hydro Hoist on the Sterling Truck.

Cut Hauling Costs With Heil Dumps

Whether it's hauling hot asphalt, ashes, rubbish, garbage, sand and gravel, or cinders, you will always find a Heil Steel Dump Body and Hydro Hoist especially adapted to do the job. Steel Dump Bodies "Made by Heil" are built the way you want them. Select the one for your City from our Catalog No. 140 and Bulletin No. 146.

Heil Hydro Hoists mount with Heil Bodies on any make or model motor truck. The hoist with TWIN cylinders and TWICE the power. Ask about the standardized Heil Ford Line of Municipal Equipment—Bodies, Hoists, Tanks and Street Sprinklers—Bulletin 150.

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Three of the five Heil-equipped dump trucks recently added to the City of Syracuse, N. Y., fleet and used in garbage and rubbish collection work.

work. Experience has shown that two per cent is more than ample for this purpose.

The cost of a diesel engine plant is subject to a number of variables, such as freight, foundations, type of building, fuel storage and accessory equipment. For estimating purposes the installed cost of a diesel engine and its accessories can be taken at $75 to $110 per h.p.

Where the engine is used for a mechanical drive and a new building or addition is not required, the cost ordinarily will not be over $75 per horsepower. Where an electrical plant of two or three units is to be installed, the cost ordinarily will range from $85 to $110 per h.p., depending on the size of the units, and the type of switchboard, building, etc. A plant equipped with three 120-h.p. diesel electric units would cost, exclusive of the building, approximately $90 per h.p., or $32,500. Of this total cost about $25,000 would be subject to maintenance expense of 2 per cent. In other words, the maintenance fund would be $500 per year.

In making a study of power costs it is also necessary to consider the interest on investment, depreciation, insurance, and taxes, all of which are commonly listed under fixed charges.

It is necessary to consider this subject of fixed charges on a fair and unprejudiced basis. It is very easily possible to so load up a plant with fixed charges that all of the gain through operating economy is offset. The advocates of purchased power are often inclined to stress the first charges since that is the only possible way in which the economy of the diesel engine generating plant can be overcome.

For the average plant the total fixed charges may be considered as: interest, 6 per cent; sinking fund, 2.72 per cent; taxes, 1.5 per cent; and insurance, 1.5 per cent. These give a total of 11.72 per cent for fixed charges. As the total investment, exclusive of the building, is approximately $32,500, the total fixed charges would be $3,800 per year. The total cost of operation, including fixed charges, is $14,561 per year or 1.51 cent per kw. hour, distributed as shown in the table below:

DISTRIBUTION OF POWER COST IN A TYPICAL DIESEL ENGINE POWER-PLANT

	Total Cost	Cost per Kw. Hr.
Fuel oil	$4,730	$0.0050
Lubricating oil	531	.0005
Labor	5,000	.0052
Maintenance at 2 per cent	500	.0006
Fixed charges, 11.72 per cent on $32,500	3,800	.0039
	$14,561	$0.0152

It must be remembered, however, that included in this cost of operation is the 2.72 per cent sinking fund which, if compounded annually, will write off the entire investment in twenty years.

For the power demand covered by a plant of this size, it is seldom possible to get a contract for outside power at less than 2½ cents per kw. hour. Even at this low rate, the savings effected by the diesel plant would be $9,091, which is a good profit on the investment.

A modern steam plant for generating this power would consume about 6 pounds of coal per kw. hour. Some small steam plants will get down as low as four pounds of coal per kw. hour, but this is exceptional and is possible only with a high yearly plant factor. In fact, six pounds of coal per kw. hour would be excellent performance at the 50 per cent yearly plant factor of the plant under discussion. The cost of operating the steam plant would be about as shown in the second table.

POWER COSTS OF A MODERN STEAM POWER-PLANT

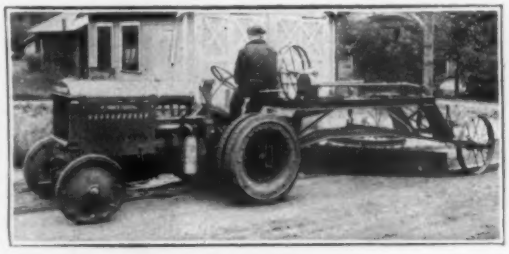
	Total Cost	Cost per Kw. Hr.
2838 tons of coal at $5.00	$14,190	$0.0153
Lubricating oil	200	.0002
Labor	8,000	.0085
Maintenance at 3 per cent	900	.0009
Fixed charges, 11.72 per cent on $35,000	4,100	.0042
	$27,390	$0.0291

This gives a total cost per kw. hour of 2.91 cents, which is good performance for a plant of this size. Compared with this cost, the diesel engine plant would save $12,799.

A Manually-operated One-Man Patrol Grader

A new one-man grader which can be quickly attached to any tractor and which is designed particularly for road-surface maintenance has been developed by the Stockland Road Machinery Company, Minneapolis, Minn. This new Stockland product is called the Whippet, because of its adaptability to a wide range of road uses. A special feature is its versatility. In addition to road-surface work, it can be used in ditch work, building slopes for the recovery of surfacing materials usually lost over the shoulder, and is simple of operation.

A grader operator who can run a tractor will have little difficulty in doing a good day's work the first time out, with this equipment, according



A STOCKLAND WHIPPET

to the manufacturer. The grader can be turned on an ordinary road with most tractors in 20 seconds. Tractor hitches, clutch extensions and seats are a part of the standard equipment. The operator sits between the grader and the tractor, as on the Stockland Patrolmobile.

The spoke shoulders of this new grader are hot-riveted both inside and out on the wheel tire and hub. French and Hecht wedge devices are used to permit the easy removal and mounting of tires when rubber tires are used. Electric steel is used in all castings subject to strain and high carbon 0.80 steel for forgings. The blade assembly is rigid with respect to the frame. Take-up facilities are incorporated in the design of the connecting-links and bearings to keep the joints tight.

Pennsylvania Cement Company Merges

The Pennsylvania-Dixie Cement Corporation, New York, has been incorporated to take over the business and property of the Pennsylvania Cement Company, The Dexter Portland Cement Company, the Dixie Portland Cement Company, and the

Cut Back Asphalt

THE accompanying photographs show one of the many uses of Stanolind Cut Back Asphalt for cold mixtures. The road shown in the photographs is Calumet Avenue between Robertsdale and Hammond, Indiana, one of the main arteries southeast of Chicago.

A few years ago this roadway was widened to accommodate increased traffic, by the addition of a strip of pavement on the outer edge. Recently, it was desired to make the grade of the asphalt macadam adjacent to the street car tracks conform to the grade of the outer strip and of the tracks.

This was accomplished at very low cost by the use of Stanolind Cut Back Asphalt for cold mixtures. The old macadam was painted with the Cut Back Asphalt and was then resurfaced with a mixture of Cut Back Asphalt and well graded stone. These materials were mixed in an ordinary hydraulic cement mixer and conveyed to the point of construction in a small two wheel cart.

The mixture was applied in the usual way by raking and rolling. The only construction equipment used was the cement mixer, the two wheel cart, the roller and tools.

This is an ideal construction for small communities whose paving programs are not large enough to warrant the use of the regular hot mix paving plant and elaborate equipment.

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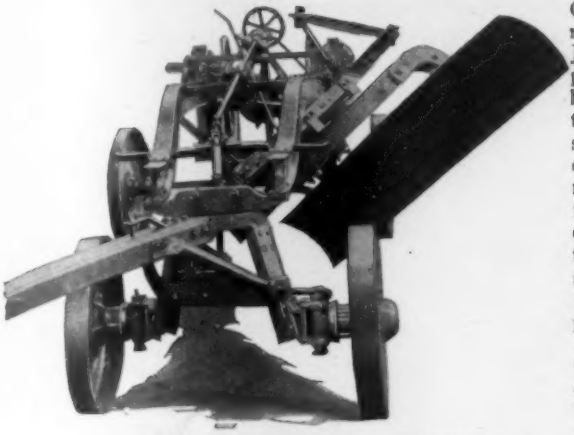
Clinchfield Portland Cement Corporation. The seven plants of the new corporation have an aggregate capacity of 10,000,000 barrels of Portland cement per year. Through its subsidiaries the corporation will produce and sell sand and gravel, limestone, tile, and other cement products.

The management of the new corporation will consist of men identified with the merging companies: Richard Hardy, Chairman of the Board; John A. Miller, President; and George Kilian, Secretary and Treasurer.



ROME GRADER WITH THE BLADE RAISED

A New Balanced Grader

The Rome grader, which has a high lift, ball and socket joints, roller bearings, and a steering device of the knuckle and spindle type, has been placed on the market by the Rome Manufacturing Company, Locomotive Department, Rome, N. Y. The grader is equipped with disc wheels which act the same as the land side on a plow, holding the machine in position when ditching and troweling, instead of tearing or roughening the bank. Long roller bearings are used on all four wheels, mounted on a long spindle. The rear axle is pivoted by a hand wheel on the rear platform.

The machine is guided by a tongue and can be turned straight around, and in that position the steering apparatus can be operated. The combination steering and horse pole is made from pressed steel and in two pieces. When used with a tractor, the front half is telescoped with the rear half, which brings both poles into use at the same time, giving an unusually strong pole.

The Rome grader is so designed that the heel of the moldboard can be raised to allow the blade to be operated at a 50-degree angle. When the moldboard is set in this manner, the grader can slope outer banks along roads without the use of a special attachment, which greatly increases the efficiency of the machine and eliminates the installation and removal of a bank sloper several times a day. Being able to set the blade in such extreme position permits the digging of the ditch at any slope desired.

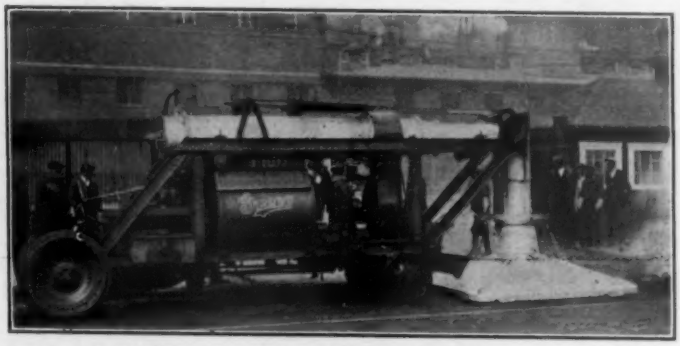
The manufacturers use drop forgings, steel castings, and cut gears, with all gears enclosed in oil-tight gear cases and running in a bath of oil. Frames and all parts are hot-riveted with large over-size rivets. The worm screws are cut from solid steel bar. The discs on the wheel are made from ¼-inch steel plate concaved to add strength.

Pavement Superheater Effects Savings in Street Work

The Good Roads Equipment Corporation, City Centre Building, Philadelphia, Pa., has recently placed on the market the Greco Junior-D pavement superheater for the repair and resurfacing of asphalt and other hard-surfaced roadways. A Fordson tractor is used for propelling and operating the superheater. The unit consists essentially of an oil burner, a blower, a sectional furnace, and a heating hood. The hood is 8 feet square, heating 64 feet of surface in one operation. The time required to heat the surface is from 10 seconds when resurfacing wood block pavement, up to ½ to 1 minute when patching or resurfacing asphalt pavement.

This machine eliminates the necessity for tearing up old pavements, whether they are of asphalt, concrete, granite block, wood block, brick, macadam, or any other hard-surfaced roadway. It vulcanizes a new wearing surface of asphaltic mixture onto any of the old pavements, regardless of how bad their condition may be. Work done by this method is of a permanent character. Officials who have used this heater report that it is more satisfactory in vulcanizing an asphalt wearing surface directly onto a portland cement foundation than the use of the so-called "binder" which does not bind the wearing surface to the foundation. The vulcanizing process hermetically seals what has always been a space between the foundation and surface where moisture, carrying the destructive solvent, has traveled several hundred feet by capillary attraction, thereby destroying the pavement from the bottom up.

Camden, N. J., has two of these heaters and has resurfaced its asphalt streets at a cost of 25½ cents per square yard. Cincinnati, Ohio, resurfaced its brick and granite block streets for 60 cents per square yard, and Dayton, Ohio, resur-



GRECO PAVEMENT SUPERHEATER IN USE BY THE CITY OF CAMDEN, N. J.

WHEN you specify Solvay Flake Calcium Chloride as the accelerating agent for use with Portland Cement in concrete construction you automatically save time and money.

Solvay Flake Calcium Chloride is essential for best concrete construction because it has been definitely established that it improves the quality of the concrete and increases the strength.

Speed up all concrete work, all the year round, with Solvay Flake Calcium Chloride.

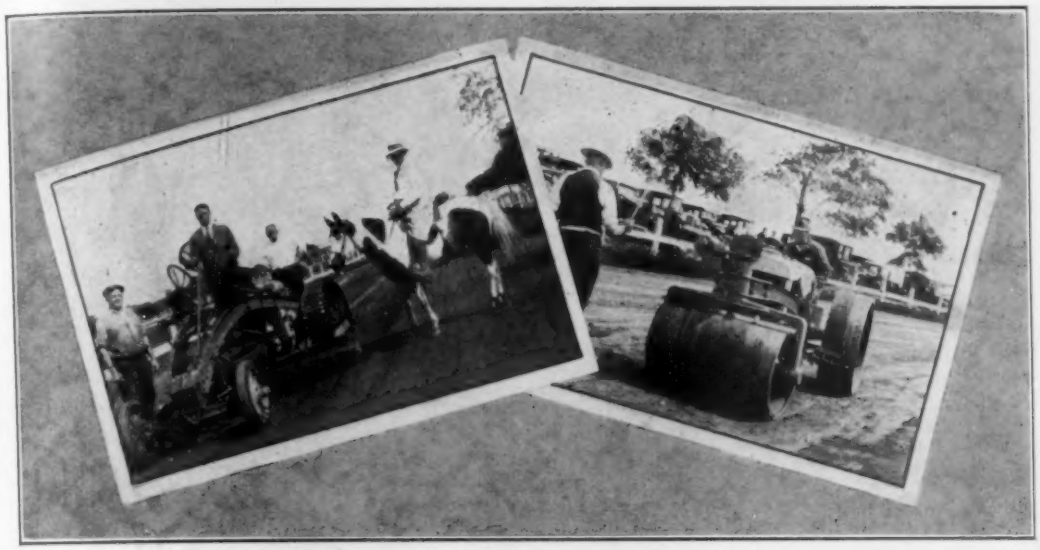
Write for Booklet No. 1053

Solvay Calcium Chloride helped the contractors, engineers and architects on each of these well-known buildings to do an essential part of the work quicker and better.

THE SOLVAY PROCESS COMPANY
Wing & Evans, Inc., Sales Dept.,
40 Rector Street, New York

faced asphalt and brick streets for 65 cents per square yard. The manufacturers claim that the Greco heater will easily do from 1,000 to 1,500 square yards per day, effecting a saving of from $500 to $1,500 per day and producing better results than by old methods.

maintains a health department, one principal function of which is to assist in the establishment of water-works. They usually have access to valuable information with reference to sources of water-supply water contamination, etc. Their services are furnished without cost.



HADFIELD-PENFIELD ONE-MAN GRADER AND THE ROLLER PUTTING RACE TRACK IN CONDITION

One-Man Graders on the Race Track

An interesting example of the versatility of one-man graders has recently come to our attention. The Board of Directors of the Flemington, N. J., County Fair Board a few weeks ago was particularly gloomy, as for some time prior to the opening of the fair it had rained almost continuously, making the track heavy. Financial loss stared the Fair Association in the face, for horse racing was the main feature of the fair.

The Sales Engineer of the Hadfield-Penfield Steel Company, Bucyrus, Ohio, volunteered to take his equipment out of the exhibit hall and make a practical showing of its ability to handle this road problem. The H-P one-man grader was put on the track, and after blading the track lightly, an H-P roller was put to work and the track given a fine surface for racing. This program was followed each day, and the racing went through without disappointment.

Five Things to Do to Get a Water System

1. *Employ a competent engineer.* In every good-size city can be found consulting engineers who make a specialty of water-works construction and sanitary engineering. Their fees are usually based upon the amount of money expended for a water system, being determined by percentage, with a small retainer fee to pay the engineer's expenses for his preliminary investigations.

2. *Ask your State Health Department for assistance.* Practically every state in the Union now

3. *Sell the idea of a water system to the public.* In the promotion of a water system in every community there comes a time when some real salesmanship is required in order to bring to the majority of the citizens the true value and desirability of the undertaking. There are many ways and means for the sales campaign to be conducted. Able assistance along this line will be furnished by the consulting engineer.

4. *Be careful about financing.* Legal advice should be secured on all of the important matters involved in the promotion and construction of a water system. It usually is the case in a new or small community, however, that a bond issue is necessary to finance the development. In order that the bonds after they have been authorized shall be salable and bring the best price on the market, it is important that they shall be approved by competent bond lawyer experts. Failure to do this may prove costly in more ways than one.

5. *Use reliable construction materials and employ a reliable contractor.* In a development as important as a water system, it is necessary that construction materials that have proved to be worthy and reliable shall be used. The advice of your consulting engineer usually will serve as a guide in this respect. The low-price contractor is not necessarily the man to do the job. Other items enter into the proposition besides the contractor's bid. Be sure he is competent, reliable, responsible and in furnishing materials uses only those that are standard and reliable.

—*Pipe Progress*, published by American Cast Iron Pipe Company, Birmingham, Ala.

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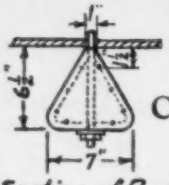

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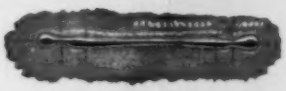

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